FIG. 1

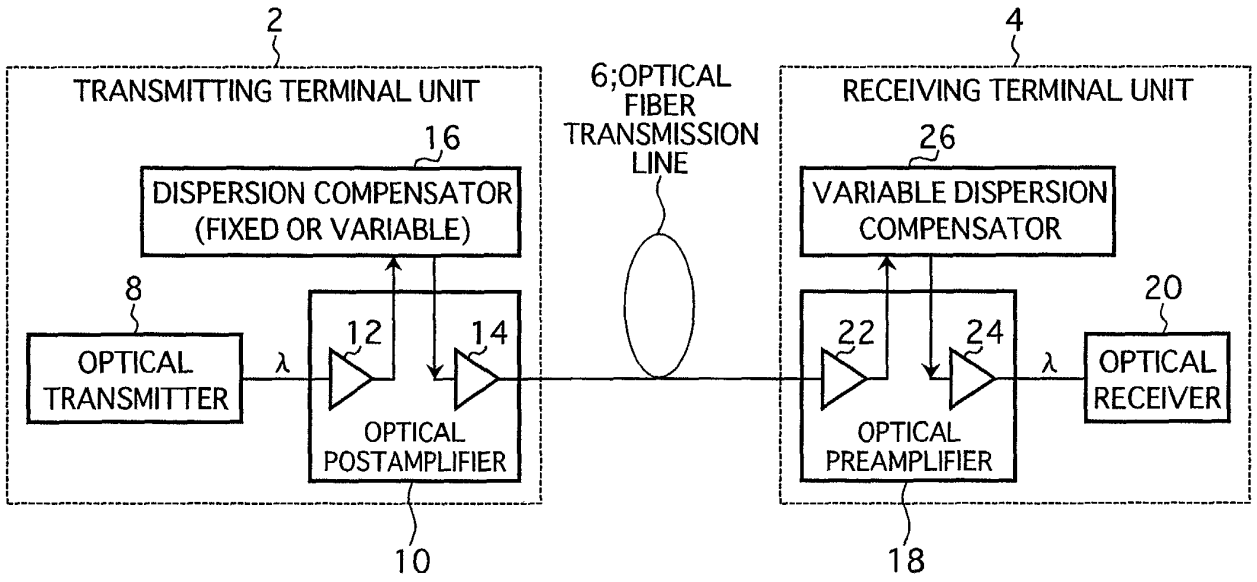


FIG. 2

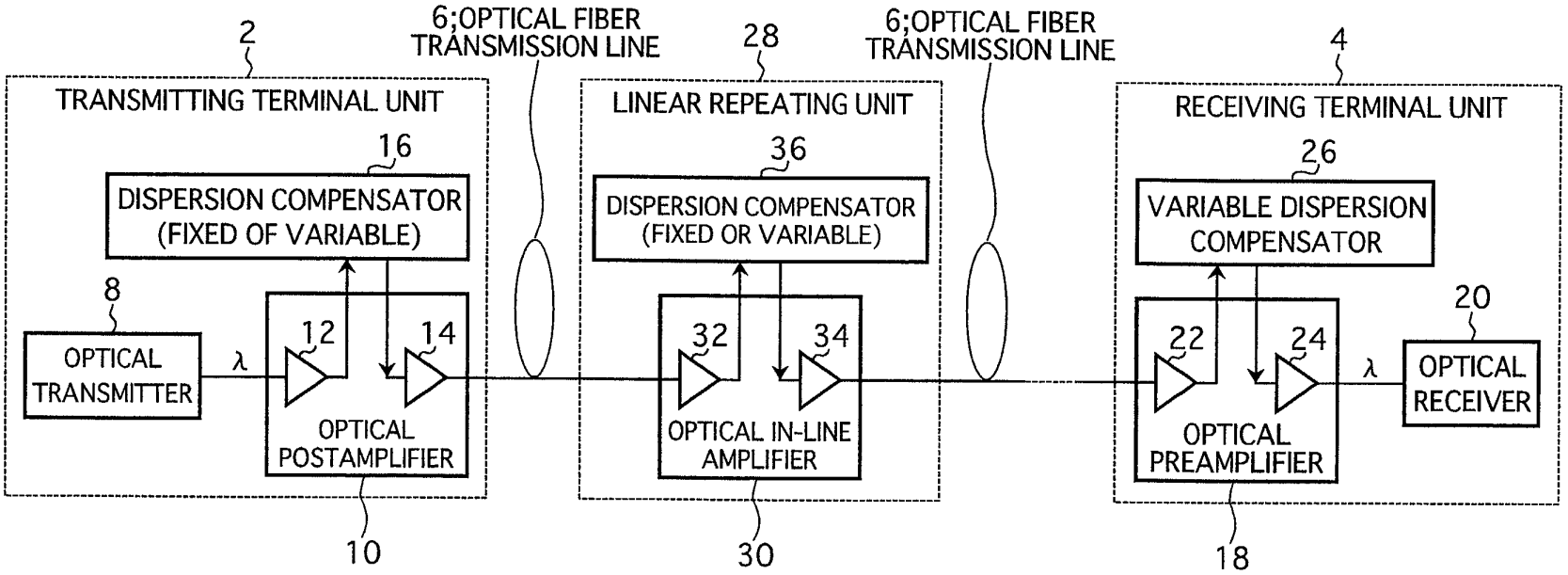
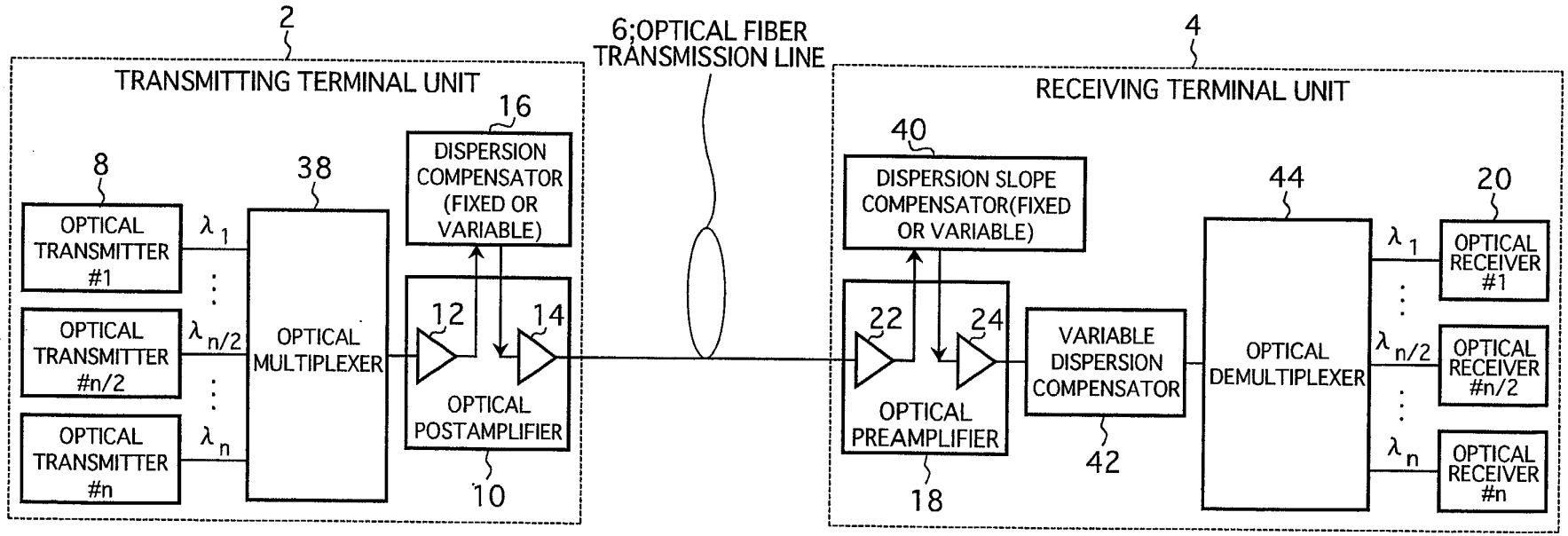

2
6;OPTICAL FIBER TRANSMISSION LINE
28
6;OPTICAL FIBER TRANSMISSION LINE
4
TRANSMITTING TERMINAL UNIT
LINEAR REPEATING UNIT
RECEIVING TERMINAL UNIT
16
DISPERSION COMPENSATOR (FIXED OF VARIABLE)
36
DISPERSION COMPENSATOR (FIXED OR VARIABLE)
26
VARIABLE DISPERSION COMPENSATOR
8
OPTICAL TRANSMITTER
λ
12
14
OPTICAL POSTAMPLIFIER
32
34
OPTICAL IN-LINE AMPLIFIER
22
24
OPTICAL PREAMPLIFIER
λ
20
OPTICAL RECEIVER
10
30
18

FIG. 3


2
TRANSMITTING TERMINAL UNIT
8
OPTICAL TRANSMITTER #1
OPTICAL TRANSMITTER #n/2
OPTICAL TRANSMITTER #n
λ 1
λ n/2
λ n
38
OPTICAL MULTIPLEXER
16
DISPERSION COMPENSATOR (FIXED OR VARIABLE)
12
14
OPTICAL POSTAMPLIFIER
10
6;OPTICAL FIBER TRANSMISSION LINE
4
RECEIVING TERMINAL UNIT
40
DISPERSION SLOPE COMPENSATOR(FIXED OR VARIABLE)
22
24
OPTICAL PREAMPLIFIER
18
VARIABLE DISPERSION COMPENSATOR
42
44
OPTICAL DEMULTIPLEXER
20
OPTICAL RECEIVER #1
OPTICAL RECEIVER #n/2
OPTICAL RECEIVER #n

F I G. 4

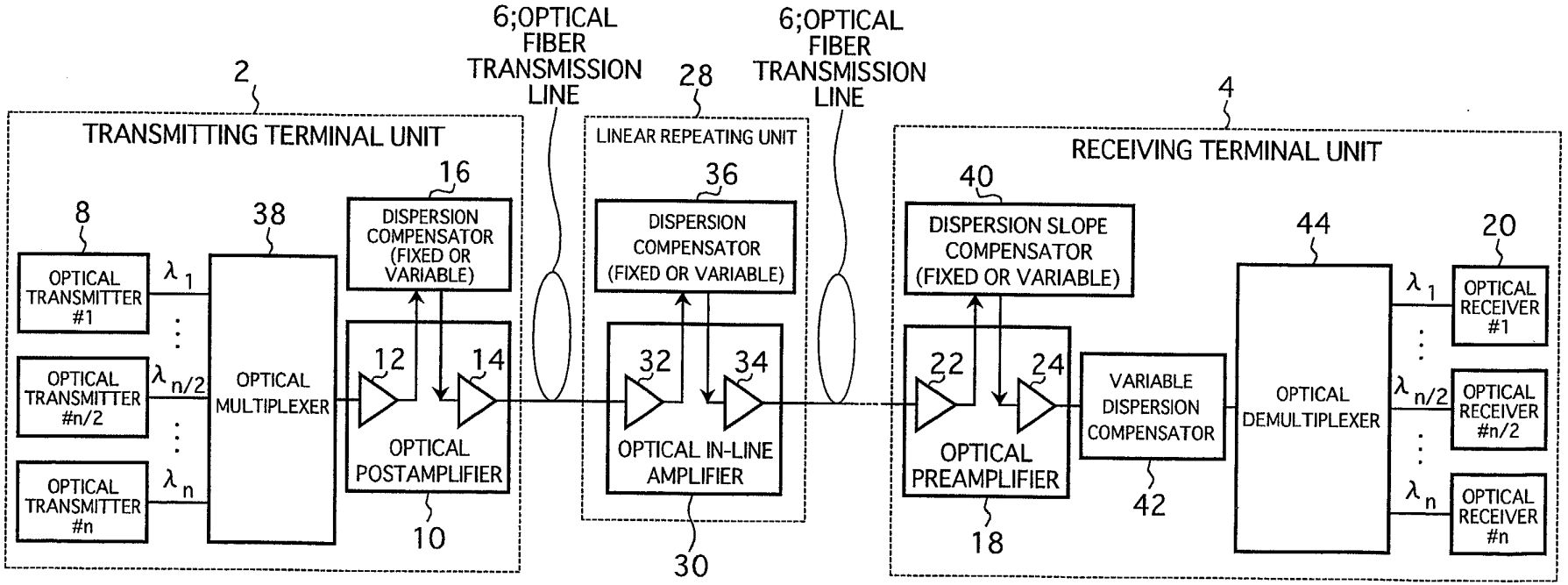

2
TRANSMITTING TERMINAL UNIT
8
OPTICAL TRANSMITTER #1
OPTICAL TRANSMITTER #n/2
OPTICAL TRANSMITTER #n
λ 1
λ n/2
λ n
38
OPTICAL MULTIPLEXER
16
DISPERSION COMPENSATOR (FIXED OR VARIABLE)
12
14
OPTICAL POSTAMPLIFIER
10
6;OPTICAL FIBER TRANSMISSION LINE
28
LINEAR REPEATING UNIT
36
DISPERSION COMPENSATOR (FIXED OR VARIABLE)
32
34
OPTICAL IN-LINE AMPLIFIER
30
6;OPTICAL FIBER TRANSMISSION LINE
4
RECEIVING TERMINAL UNIT
40
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
22
24
OPTICAL PREAMPLIFIER
18
VARIABLE DISPERSION COMPENSATOR
42
44
OPTICAL DEMULTIPLEXER
20
λ 1
λ n/2
λ n
OPTICAL RECEIVER #1
OPTICAL RECEIVER #n/2
OPTICAL RECEIVER #n

FIG. 5

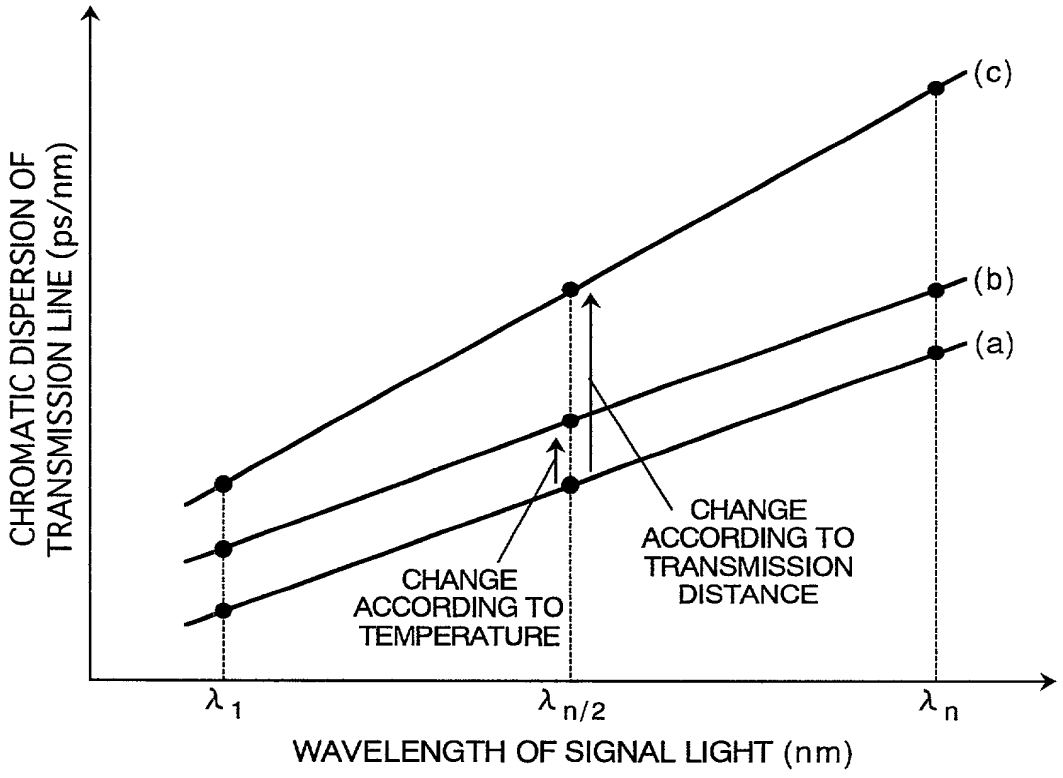

CHROMATIC DISPERSION OF TRANSMISSION LINE (ps/nm)
(c)
(b)
(a)
CHANGE ACCORDING TO TRANSMISSION DISTANCE
CHANGE ACCORDING TO TEMPERATURE
λ 1
λ n/2
λ n
WAVELENGTH OF SIGNAL LIGHT (nm)

FIG. 6

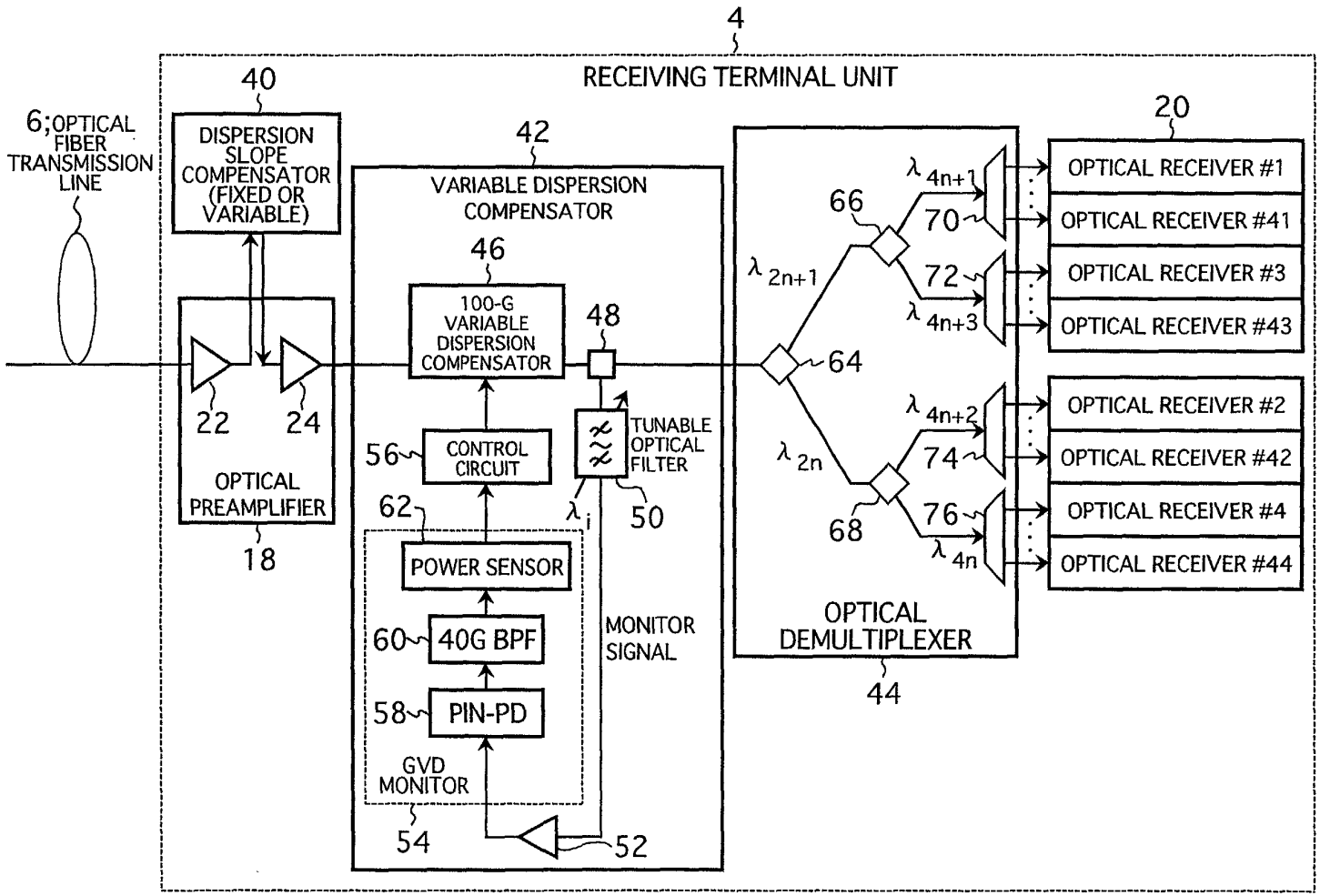


FIG. 7

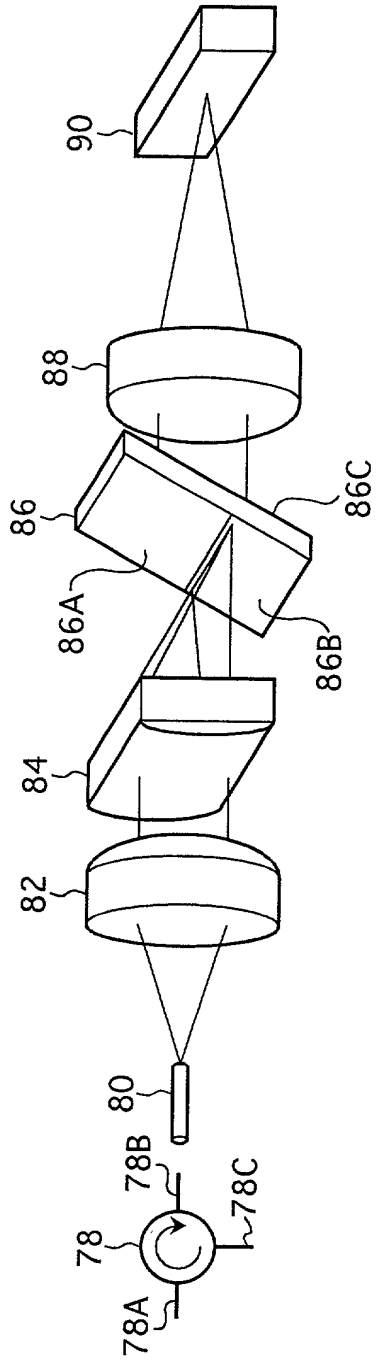
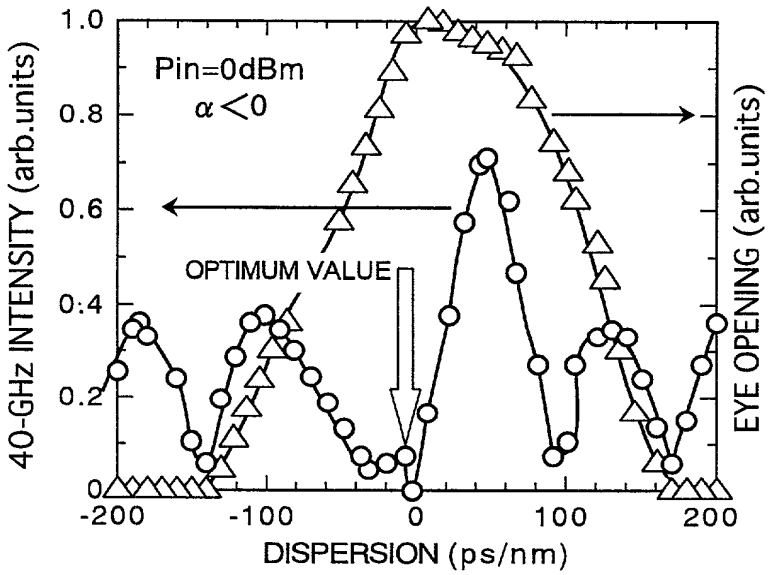
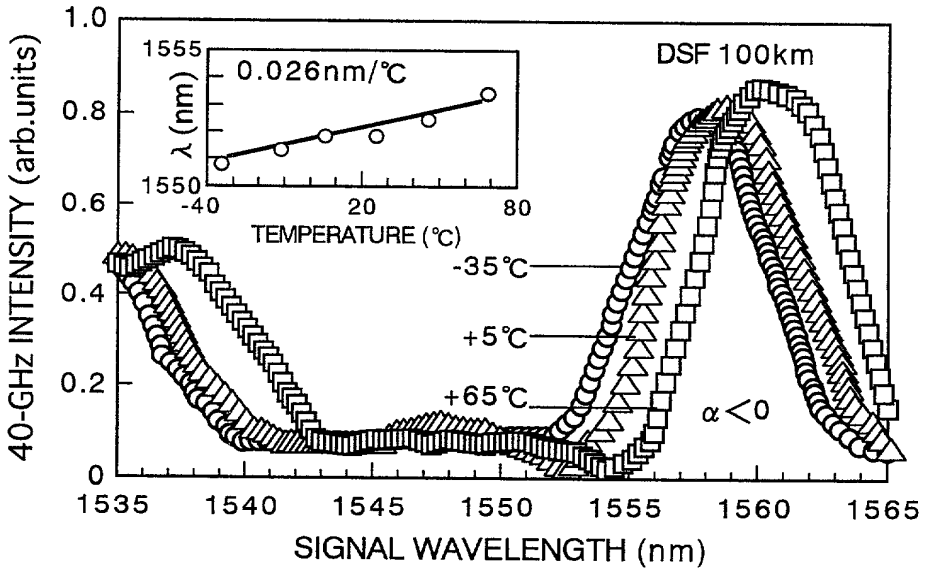


FIG. 8


Pin=0dBm
α<0
OPTIMUM VALUE
40-GHz INTENSITY (arb.units)
EYE OPENING (arb.units)
DISPERSION (ps/nm)
1.0
0.8
0.6
0.4
0.2
0
-200
-100
0
100
200

F I G. 9


1.0
0.8
0.6
0.4
0.2
0
40-GHz INTENSITY (arb.units)
1535
1540
1545
1550
1555
1560
1565
SIGNAL WAVELENGTH (nm)
DSF 100km
-35℃
+5℃
+65℃
α<0
1555
1550
λ (nm)
0.026nm/℃
-40
20
80
TEMPERATURE (℃)

F I G. 1 0

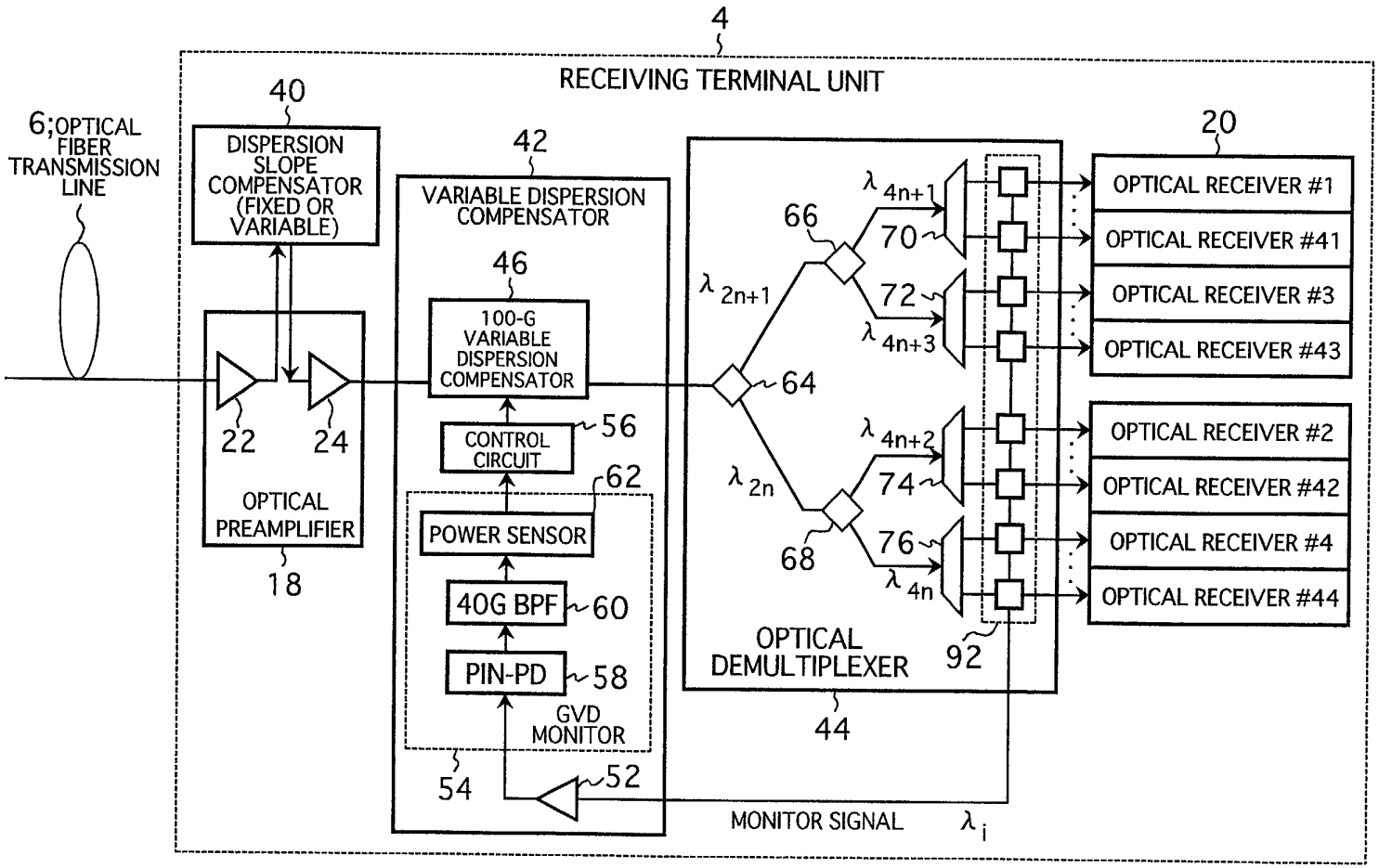
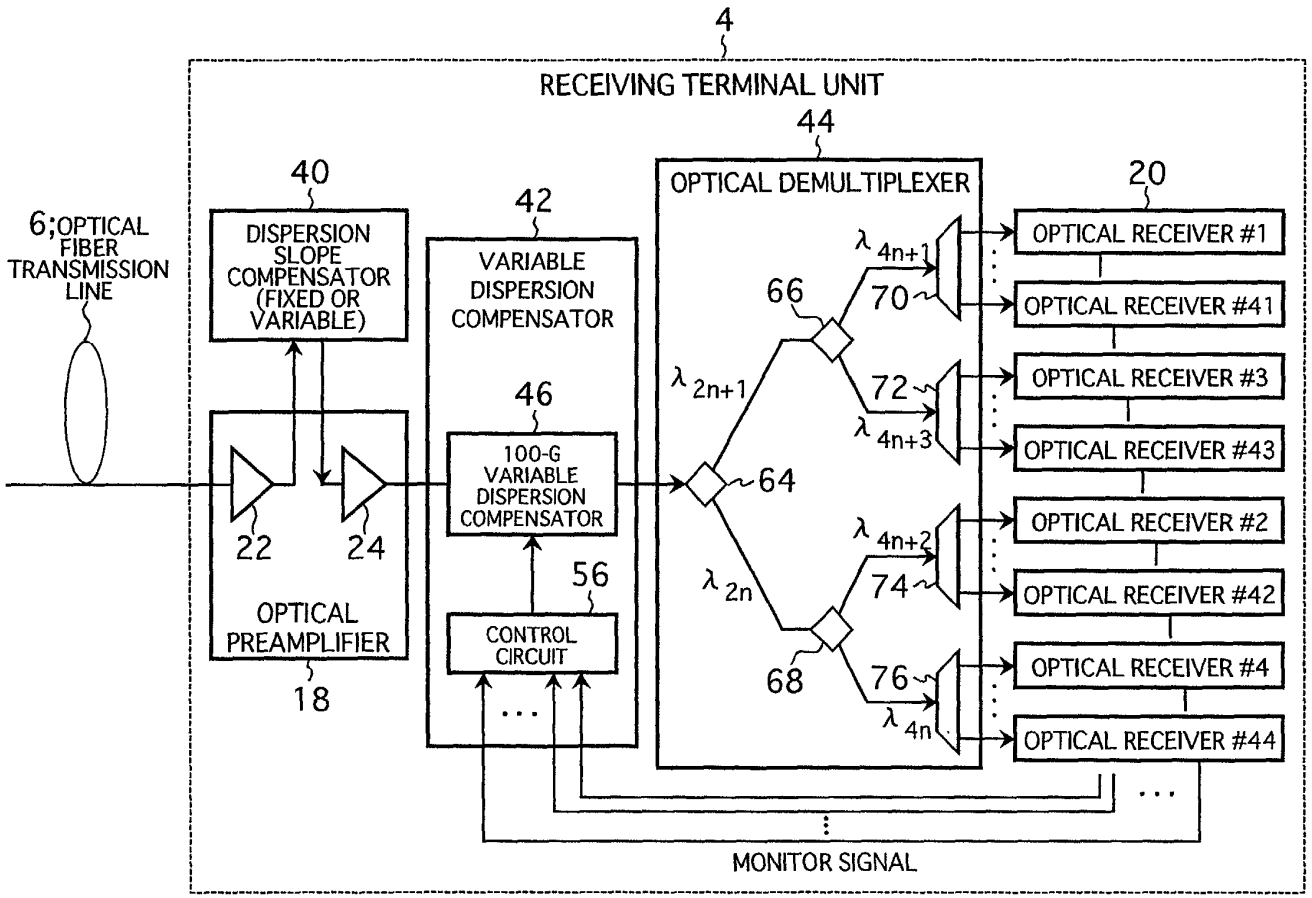

4
RECEIVING TERMINAL UNIT
6;OPTICAL FIBER TRANSMISSION LINE
40
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
42
VARIABLE DISPERSION COMPENSATOR
46
100-G VARIABLE DISPERSION COMPENSATOR
CONTROL CIRCUIT
56
62
POWER SENSOR
40G BPF
60
PIN-PD
58
GVD MONITOR
54
52
22
24
OPTICAL PREAMPLIFIER
18
66
64
68
70
72
74
76
92
OPTICAL DEMULTIPLEXER
44
20
OPTICAL RECEIVER #1
OPTICAL RECEIVER #41
OPTICAL RECEIVER #3
OPTICAL RECEIVER #43
OPTICAL RECEIVER #2
OPTICAL RECEIVER #42
OPTICAL RECEIVER #4
OPTICAL RECEIVER #44
MONITOR SIGNAL

FIG. 11



F I G. 1 2

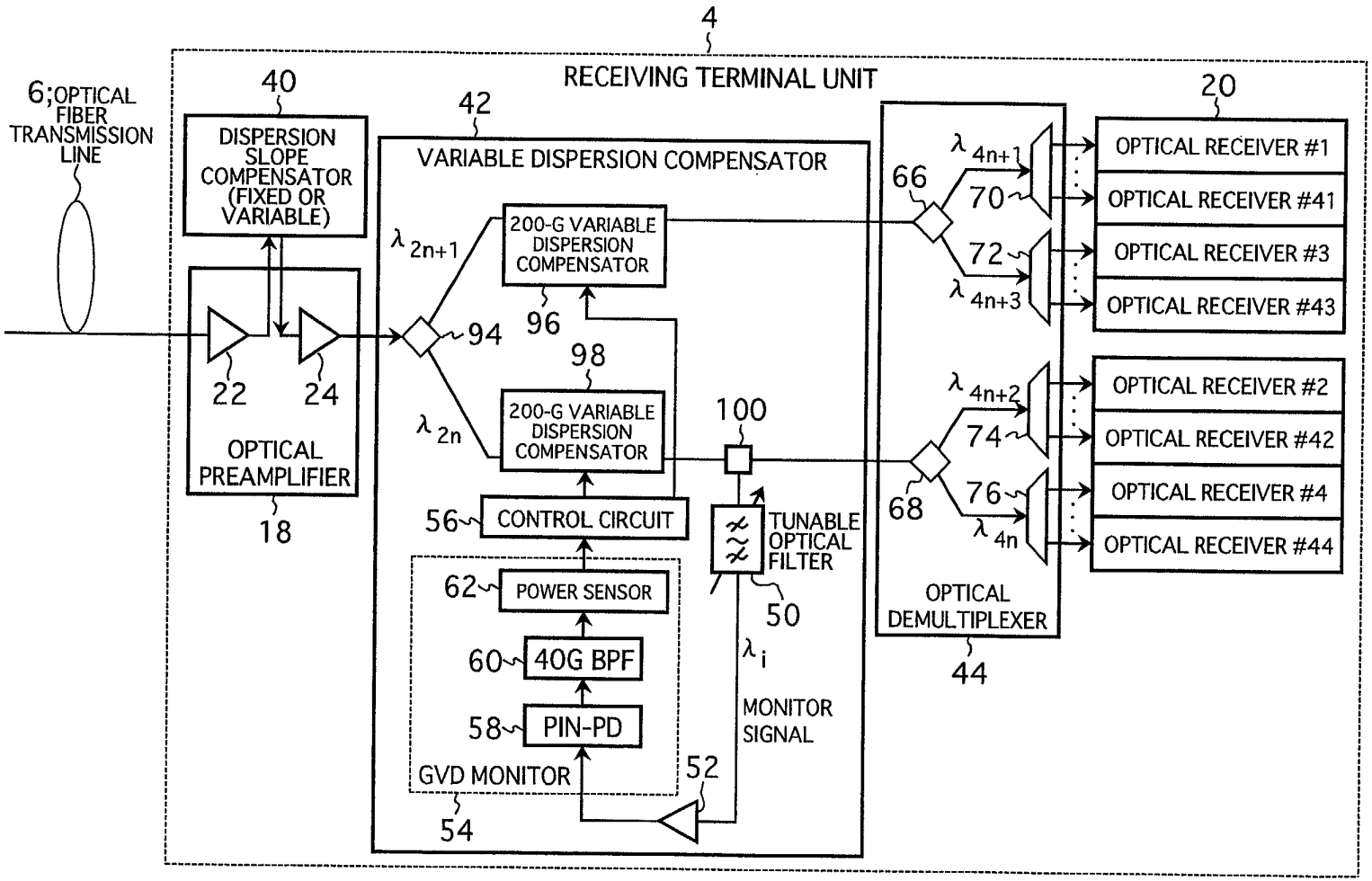
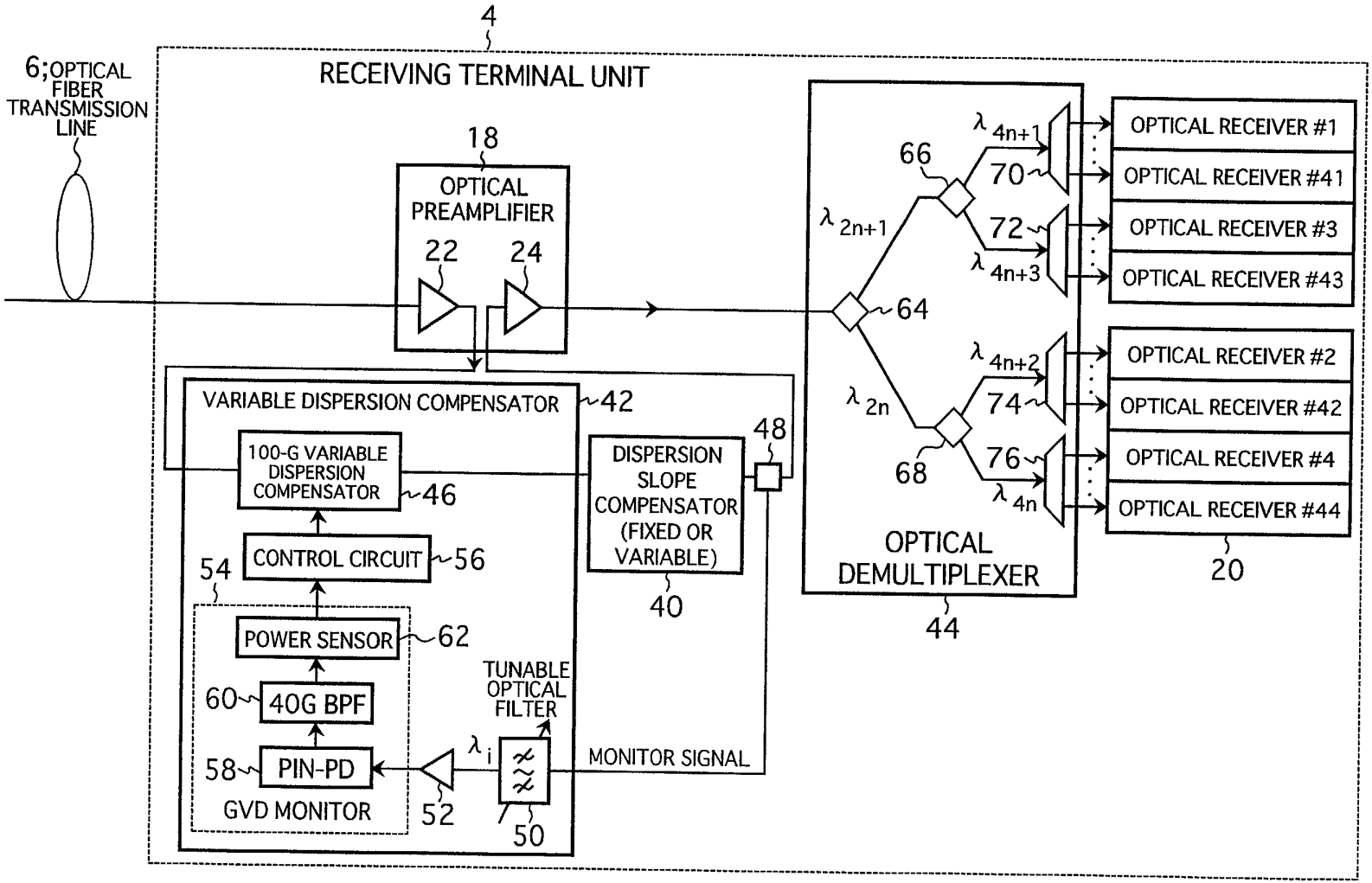

4
RECEIVING TERMINAL UNIT
6;OPTICAL FIBER TRANSMISSION LINE
40
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
42
VARIABLE DISPERSION COMPENSATOR
20
OPTICAL RECEIVER #1
OPTICAL RECEIVER #41
OPTICAL RECEIVER #3
OPTICAL RECEIVER #43
OPTICAL RECEIVER #2
OPTICAL RECEIVER #42
OPTICAL RECEIVER #4
OPTICAL RECEIVER #44
66
70
72
68
74
76
λ 4n+1
λ 4n+3
λ 4n+2
λ 4n
λ 2n+1
λ 2n
200-G VARIABLE DISPERSION COMPENSATOR
96
98
94
100
22
24
OPTICAL PREAMPLIFIER
18
56
CONTROL CIRCUIT
TUNABLE OPTICAL FILTER
50
62
POWER SENSOR
60
40G BPF
58
PIN-PD
GVD MONITOR
54
52
λi
MONITOR SIGNAL
OPTICAL DEMULTIPLEXER
44

FIG. 13



F I G. 1 4

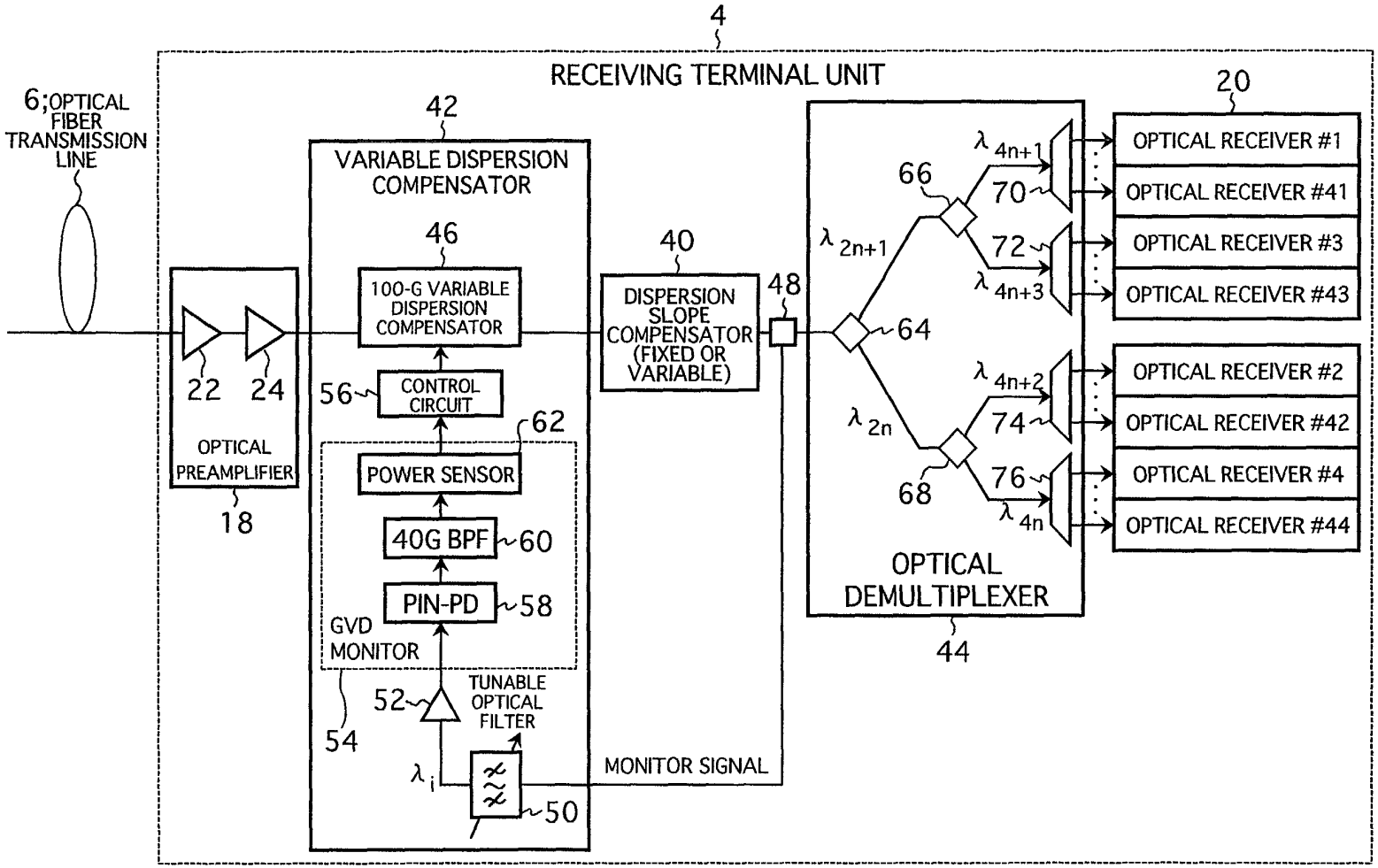

4
RECEIVING TERMINAL UNIT
6;OPTICAL FIBER TRANSMISSION LINE
42
VARIABLE DISPERSION COMPENSATOR
46
100-G VARIABLE DISPERSION COMPENSATOR
40
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
48
22
24
OPTICAL PREAMPLIFIER
18
56
CONTROL CIRCUIT
62
POWER SENSOR
40G BPF
60
PIN-PD
58
GVD MONITOR
54
52
TUNABLE OPTICAL FILTER
λi
50
MONITOR SIGNAL
66
λ 2n+1
64
λ 2n
68
λ 4n+1
70
72
λ 4n+3
λ 4n+2
74
76
λ 4n
OPTICAL DEMULTIPLEXER
44
20
OPTICAL RECEIVER #1
OPTICAL RECEIVER #41
OPTICAL RECEIVER #3
OPTICAL RECEIVER #43
OPTICAL RECEIVER #2
OPTICAL RECEIVER #42
OPTICAL RECEIVER #4
OPTICAL RECEIVER #44

FIG. 15

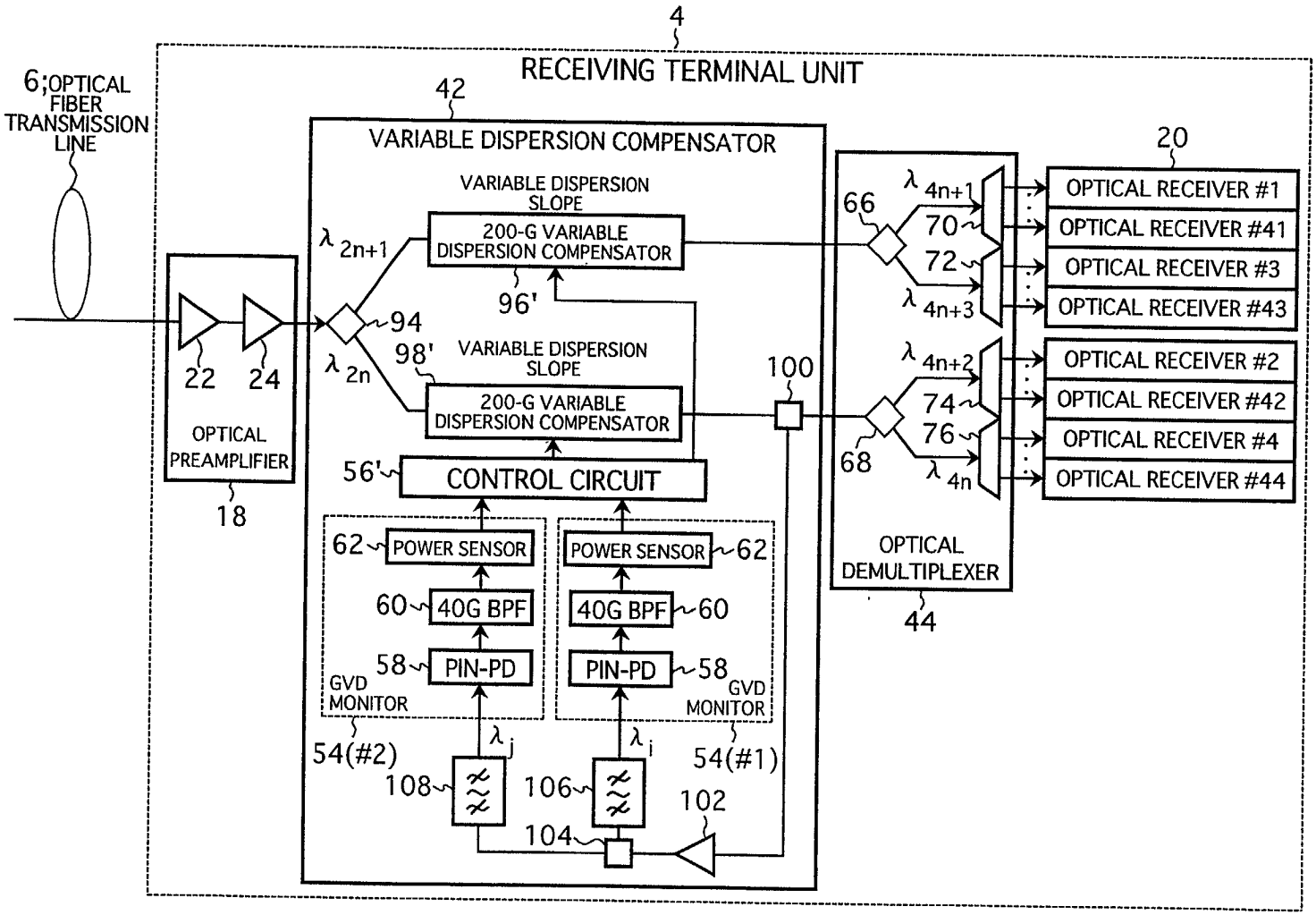
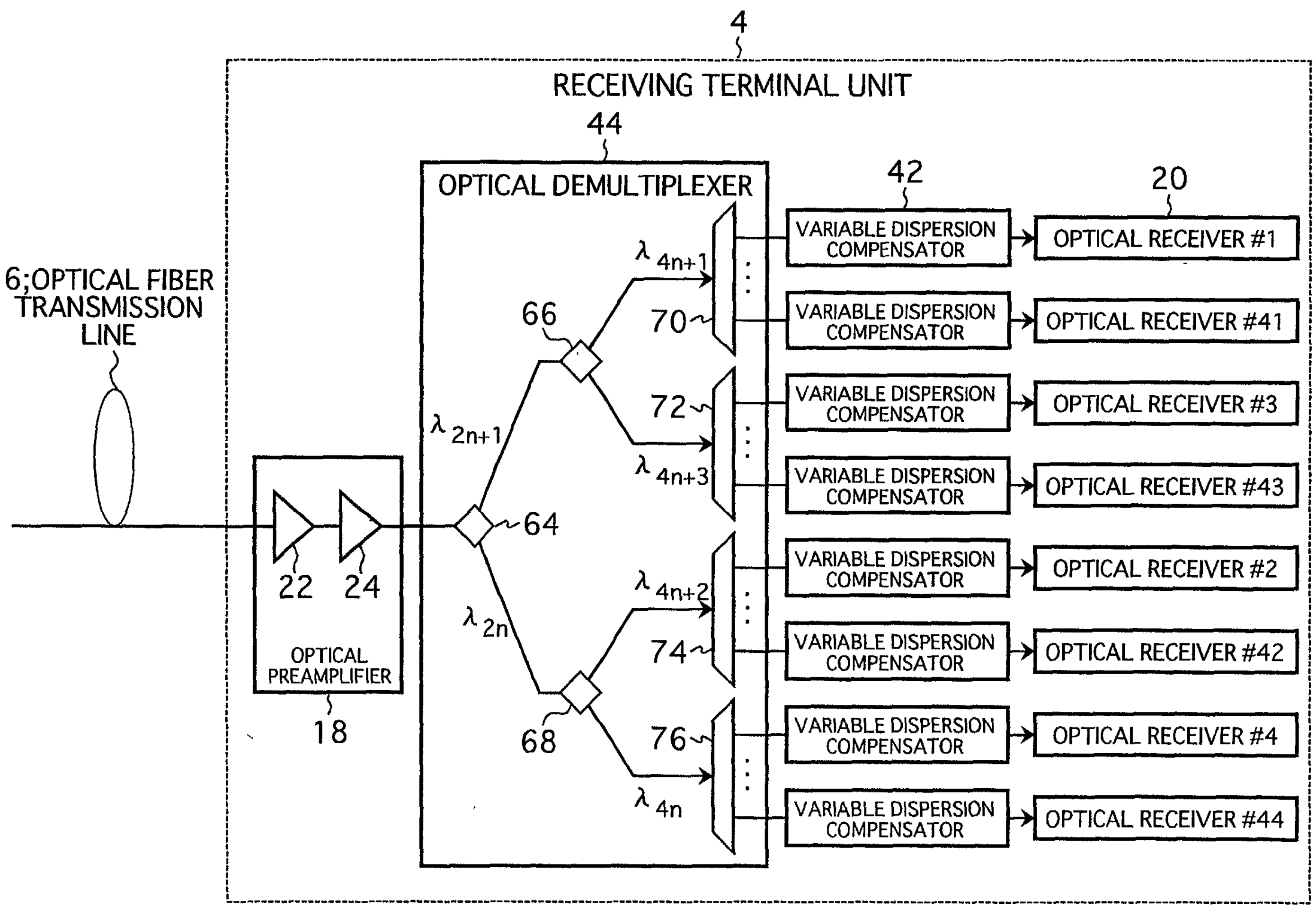


FIG. 16


4
RECEIVING TERMINAL UNIT
44
OPTICAL DEMULTIPLEXER
42
20
6;OPTICAL FIBER TRANSMISSION LINE
VARIABLE DISPERSION COMPENSATOR
OPTICAL RECEIVER #1
OPTICAL RECEIVER #41
OPTICAL RECEIVER #3
OPTICAL RECEIVER #43
OPTICAL RECEIVER #2
OPTICAL RECEIVER #42
OPTICAL RECEIVER #4
OPTICAL RECEIVER #44
λ 4n+1
λ 4n+3
λ 4n+2
λ 4n
λ 2n+1
λ 2n
66
64
68
70
72
74
76
22
24
OPTICAL PREAMPLIFIER
18

F I G. 1 7

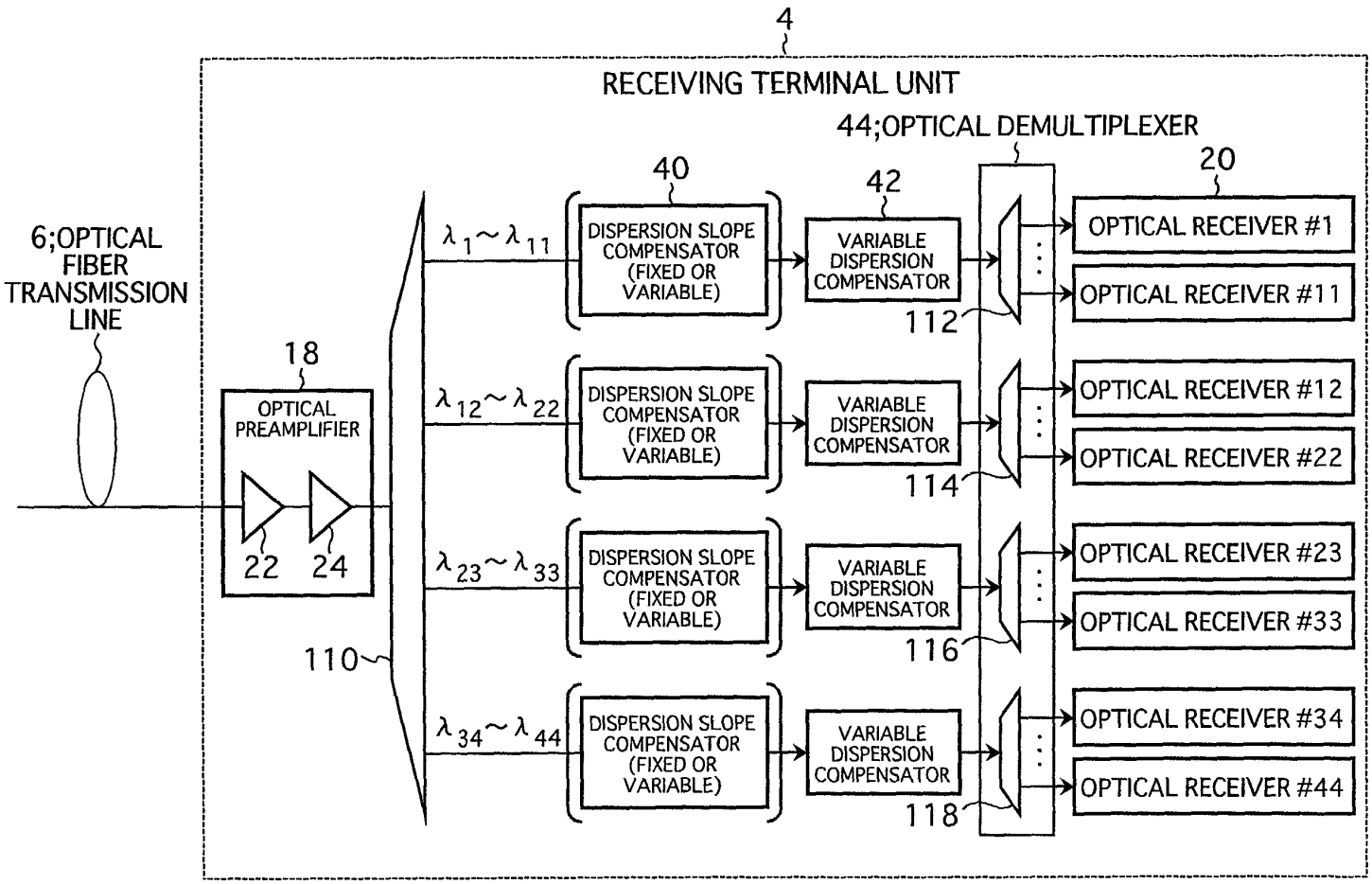


FIG. 18

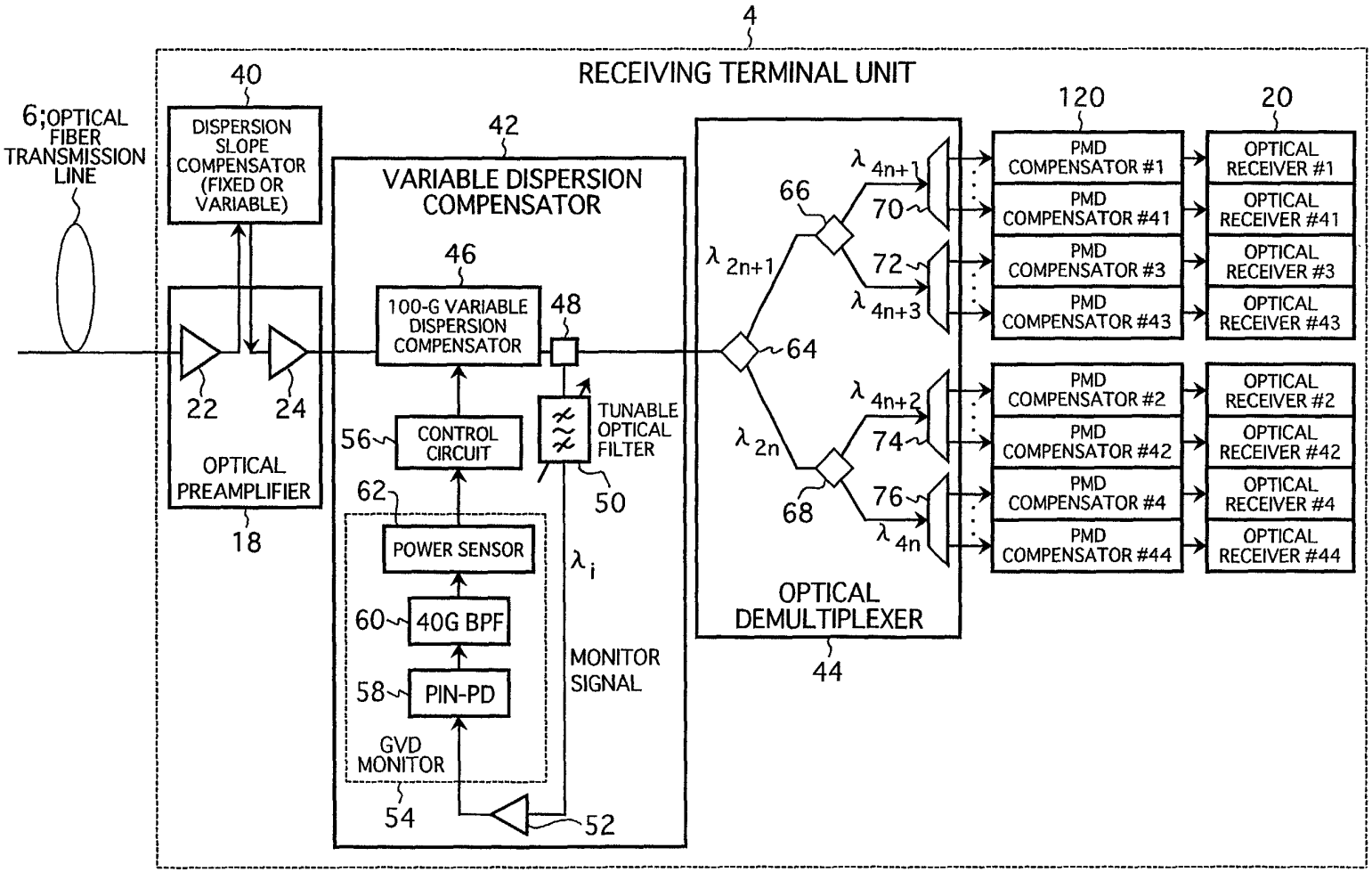


FIG. 19

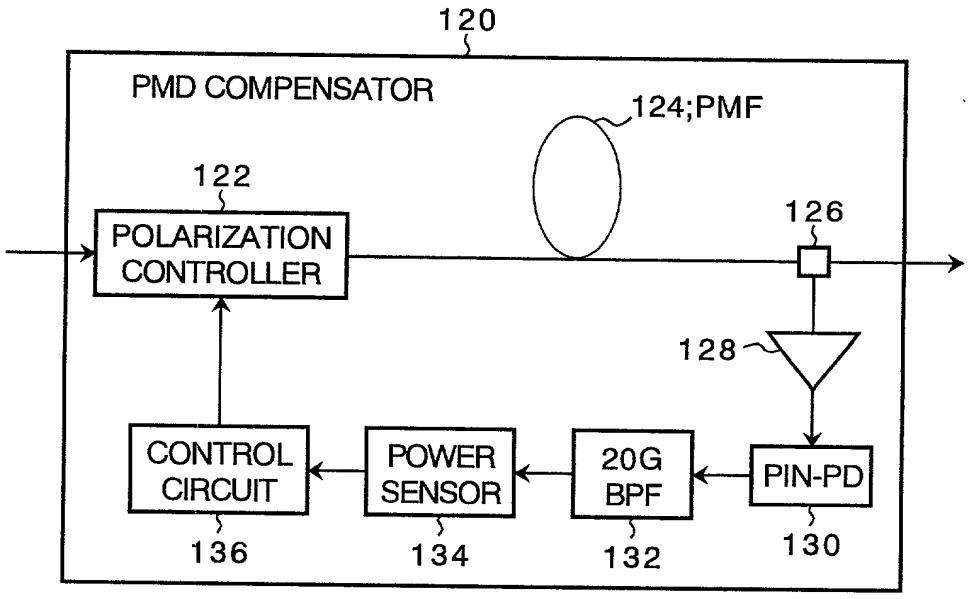

120
PMD COMPENSATOR
124;PMF
122
POLARIZATION CONTROLLER
126
128
CONTROL CIRCUIT
136
POWER SENSOR
134
20G BPF
132
PIN-PD
130

FIG. 20

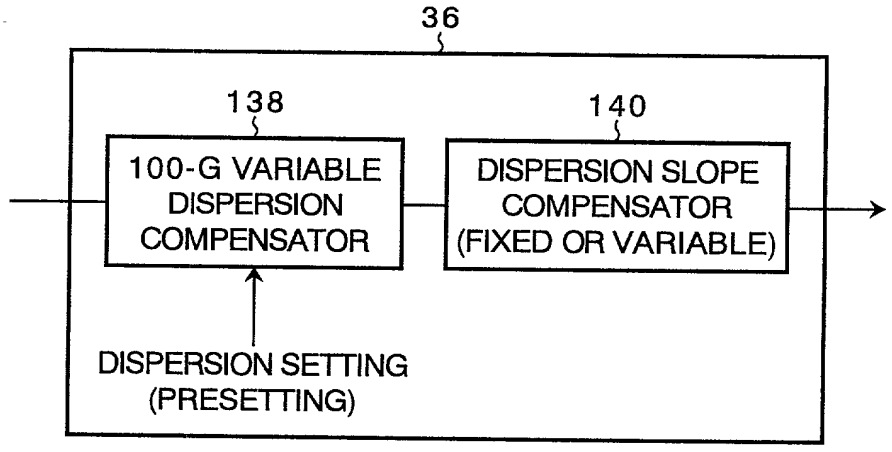

36
138
100-G VARIABLE DISPERSION COMPENSATOR
140
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
DISPERSION SETTING (PRESETTING)

FIG. 21

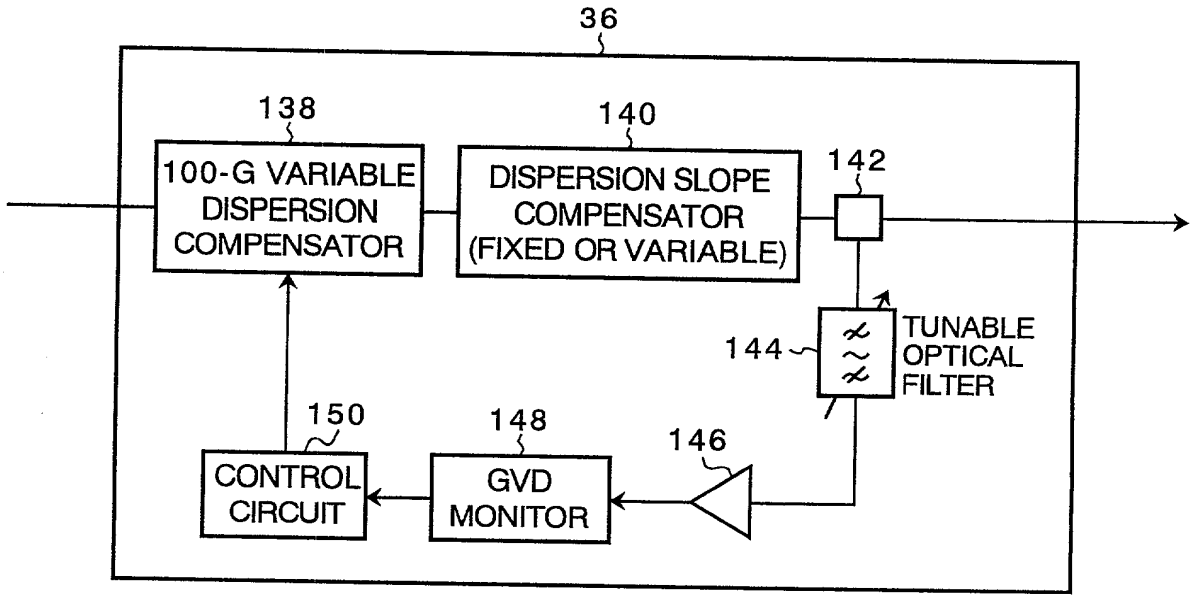

36
138
100-G VARIABLE DISPERSION COMPENSATOR
140
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
142
144
TUNABLE OPTICAL FILTER
146
148
GVD MONITOR
150
CONTROL CIRCUIT

FIG. 22

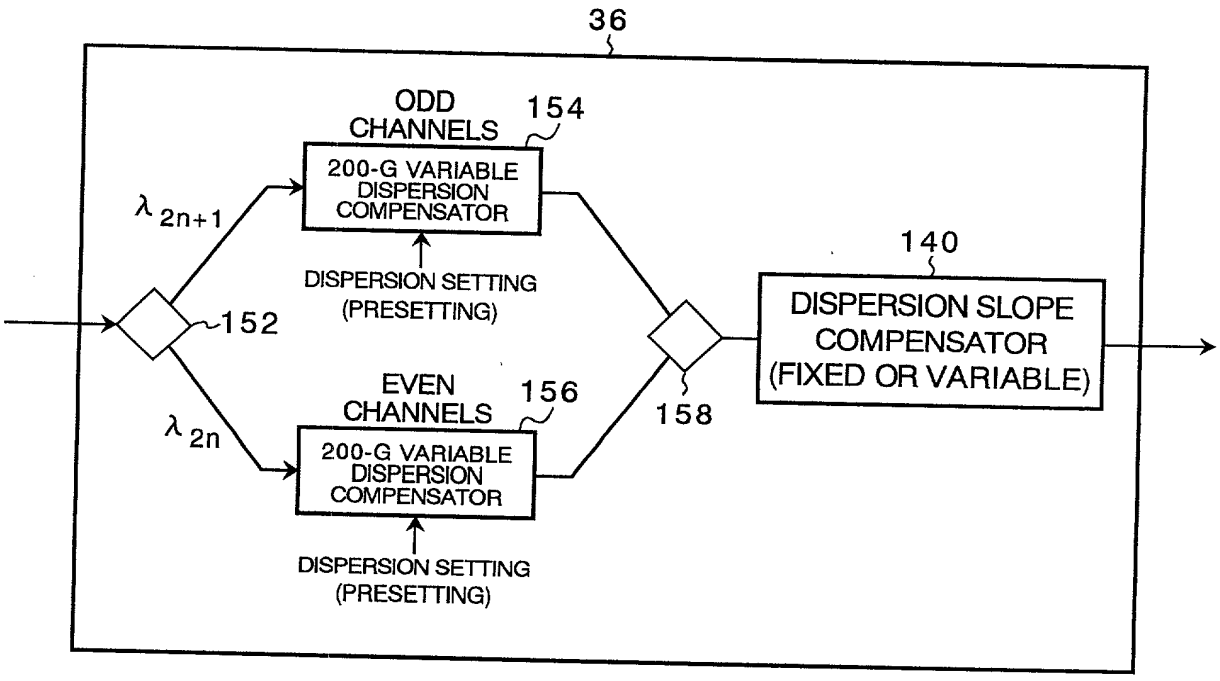

36
ODD CHANNELS
154
200-G VARIABLE DISPERSION COMPENSATOR
λ 2n+1
DISPERSION SETTING (PRESETTING)
152
140
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
EVEN CHANNELS
156
158
λ 2n
200-G VARIABLE DISPERSION COMPENSATOR
DISPERSION SETTING (PRESETTING)

FIG. 23

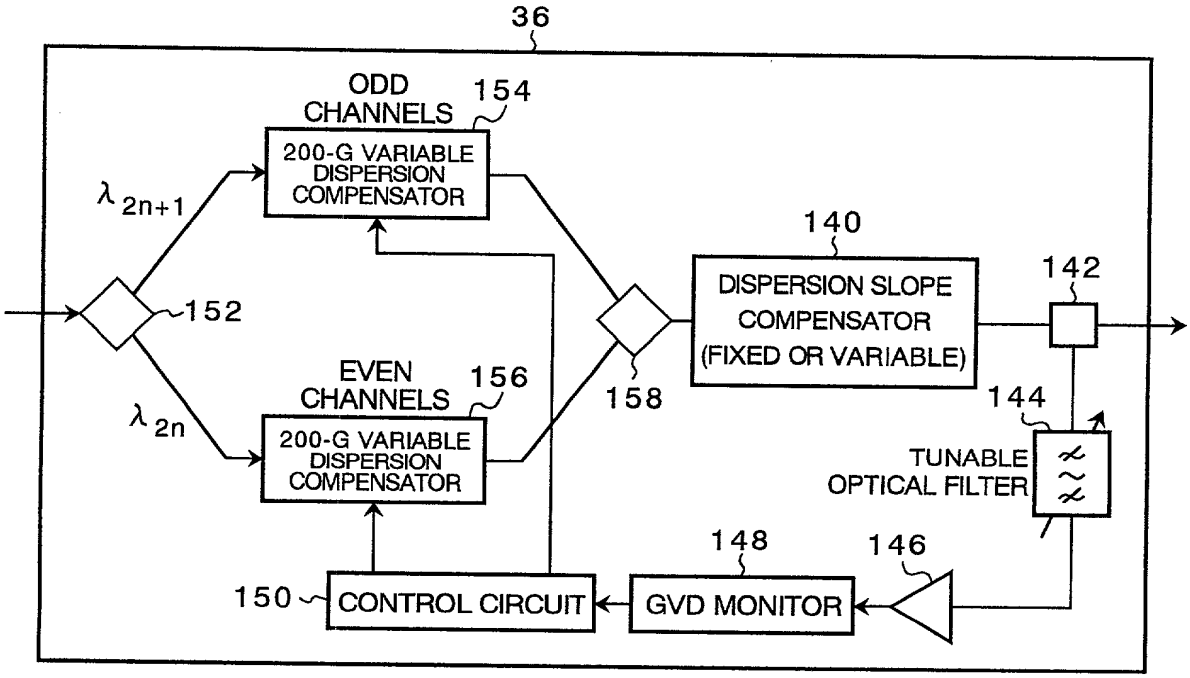

36
ODD CHANNELS
154
200-G VARIABLE DISPERSION COMPENSATOR
λ 2n+1
152
140
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
142
EVEN CHANNELS
156
158
λ 2n
200-G VARIABLE DISPERSION COMPENSATOR
144
TUNABLE OPTICAL FILTER
148
146
150
CONTROL CIRCUIT
GVD MONITOR

FIG. 24

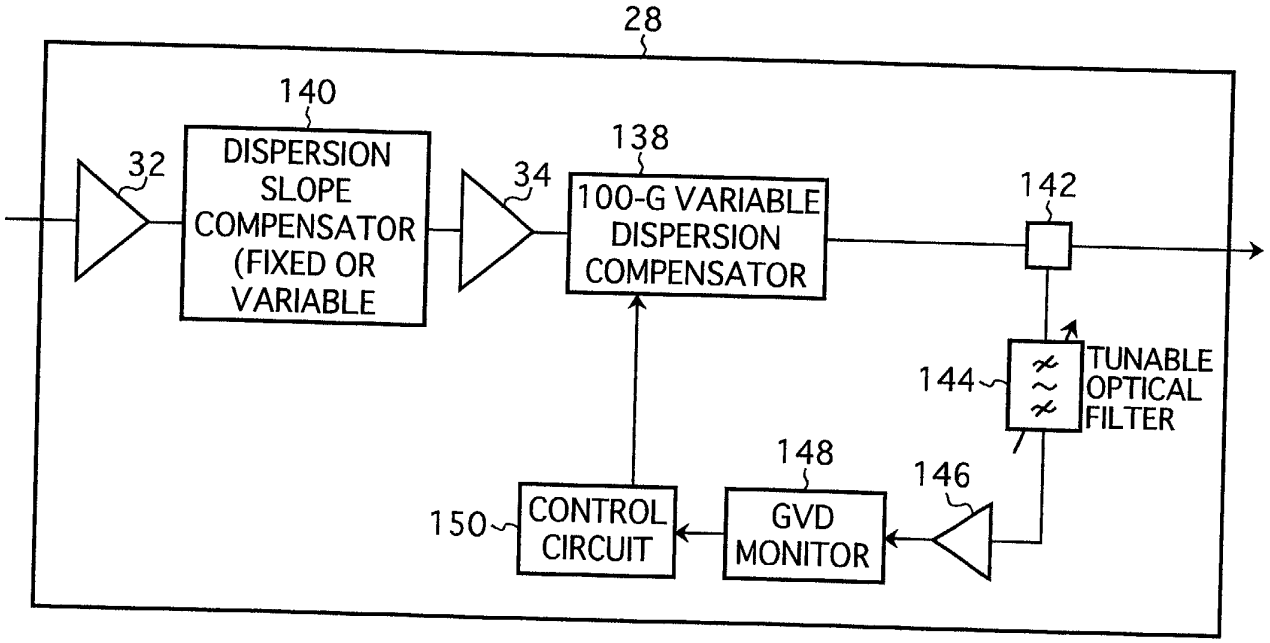
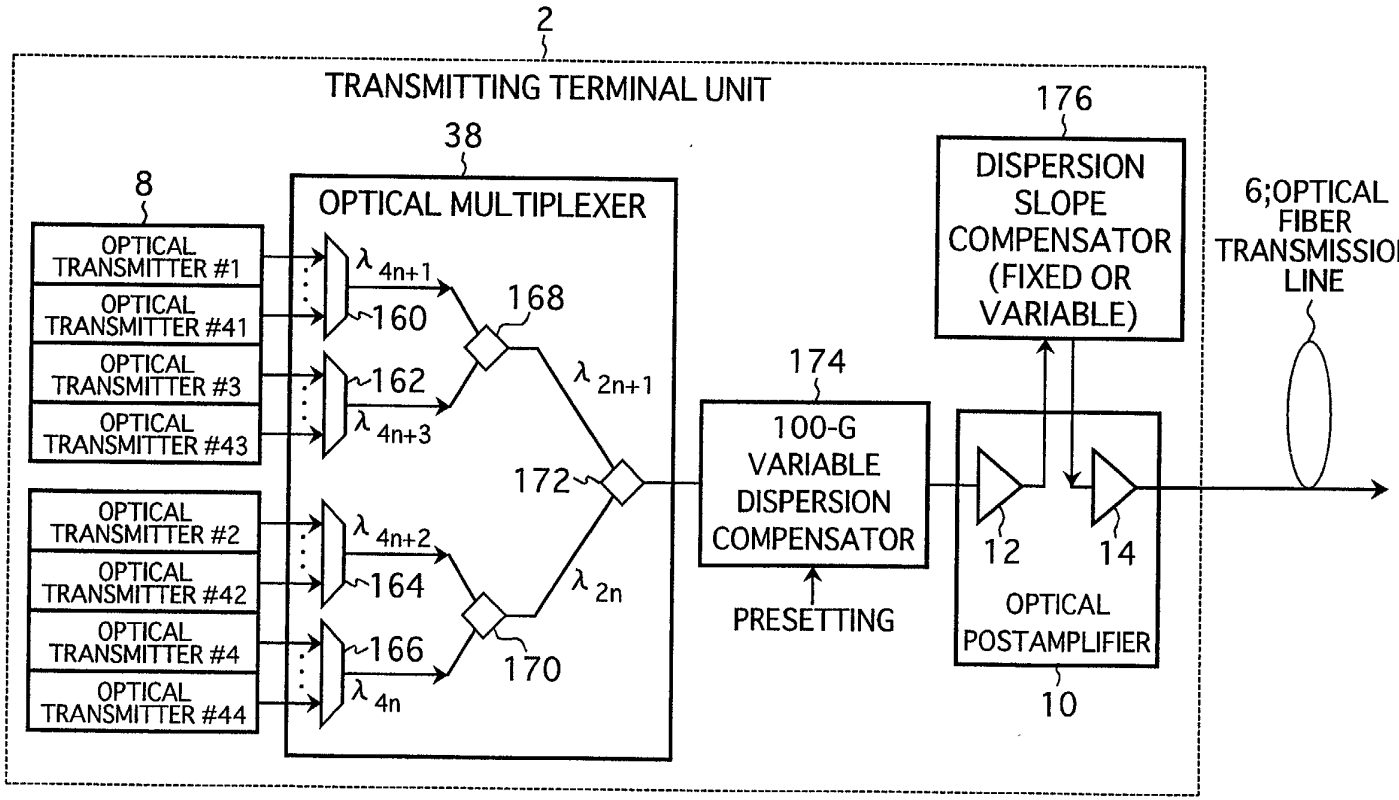

28
140
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE
32
34
138
100-G VARIABLE DISPERSION COMPENSATOR
142
144
TUNABLE OPTICAL FILTER
148
146
150
CONTROL CIRCUIT
GVD MONITOR

FIG. 25


2
TRANSMITTING TERMINAL UNIT
38
OPTICAL MULTIPLEXER
8
OPTICAL TRANSMITTER #1
OPTICAL TRANSMITTER #41
OPTICAL TRANSMITTER #3
OPTICAL TRANSMITTER #43
OPTICAL TRANSMITTER #2
OPTICAL TRANSMITTER #42
OPTICAL TRANSMITTER #4
OPTICAL TRANSMITTER #44
λ 4n+1
160
162
λ 4n+3
λ 4n+2
164
166
λ 4n
168
172
170
λ 2n+1
λ 2n
174
100-G VARIABLE DISPERSION COMPENSATOR
PRESETTING
176
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
12
14
OPTICAL POSTAMPLIFIER
10
6;OPTICAL FIBER TRANSMISSION LINE

F I G. 2 6

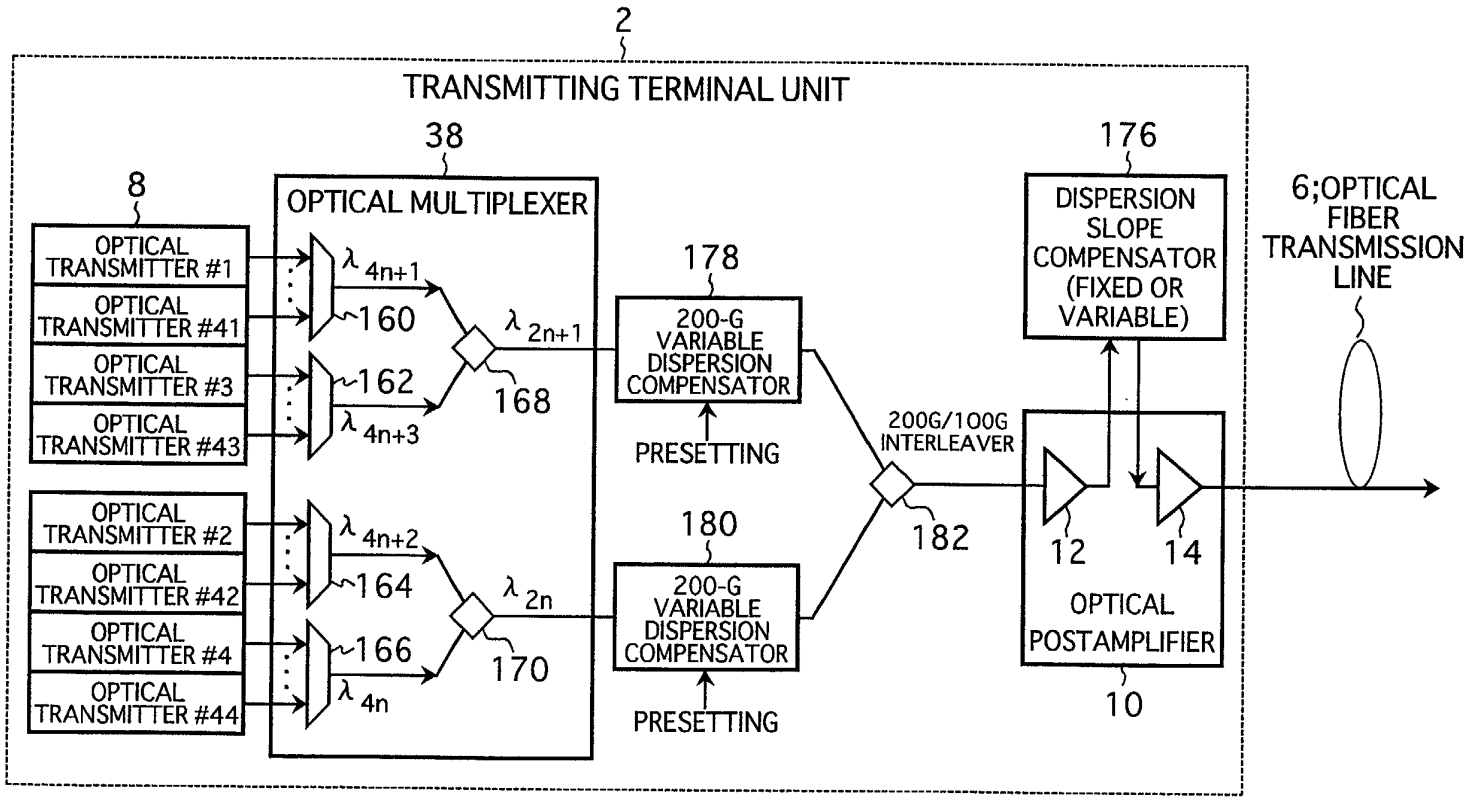
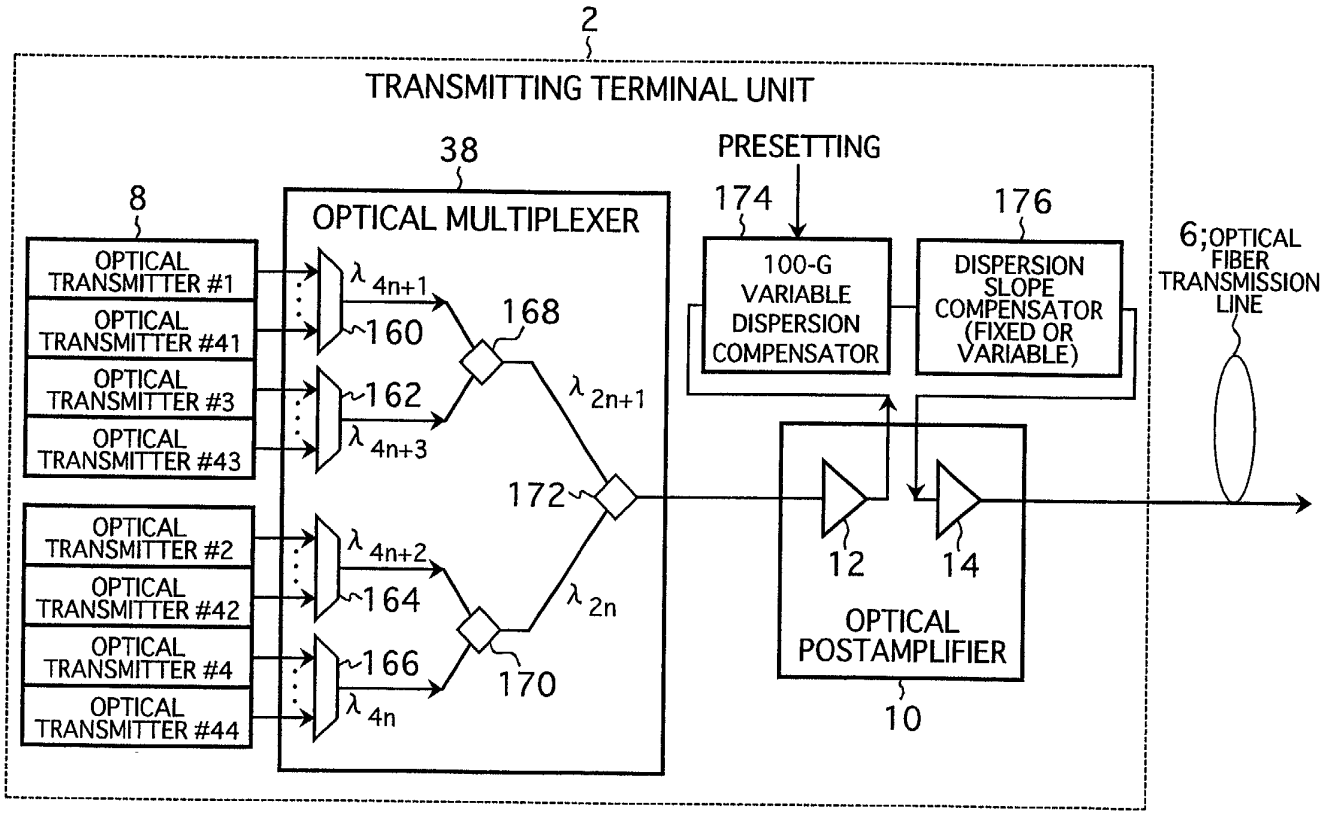

2
TRANSMITTING TERMINAL UNIT
38
OPTICAL MULTIPLEXER
8
OPTICAL TRANSMITTER #1
OPTICAL TRANSMITTER #41
OPTICAL TRANSMITTER #3
OPTICAL TRANSMITTER #43
OPTICAL TRANSMITTER #2
OPTICAL TRANSMITTER #42
OPTICAL TRANSMITTER #4
OPTICAL TRANSMITTER #44
λ 4n+1
160
λ 4n+3
162
λ 4n+2
164
λ 4n
166
λ 2n+1
168
λ 2n
170
178
200-G VARIABLE DISPERSION COMPENSATOR
PRESETTING
180
200-G VARIABLE DISPERSION COMPENSATOR
PRESETTING
200G/100G INTERLEAVER
182
176
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
12
14
OPTICAL POSTAMPLIFIER
10
6;OPTICAL FIBER TRANSMISSION LINE

FIG. 27


2
TRANSMITTING TERMINAL UNIT
38
OPTICAL MULTIPLEXER
8
PRESETTING
174
176
OPTICAL TRANSMITTER #1
OPTICAL TRANSMITTER #41
OPTICAL TRANSMITTER #3
OPTICAL TRANSMITTER #43
OPTICAL TRANSMITTER #2
OPTICAL TRANSMITTER #42
OPTICAL TRANSMITTER #4
OPTICAL TRANSMITTER #44
λ 4n+1
160
162
λ 4n+3
λ 4n+2
164
166
λ 4n
168
170
λ 2n+1
λ 2n
172
100-G VARIABLE DISPERSION COMPENSATOR
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
6;OPTICAL FIBER TRANSMISSION LINE
12
14
OPTICAL POSTAMPLIFIER
10

F I G. 2 8

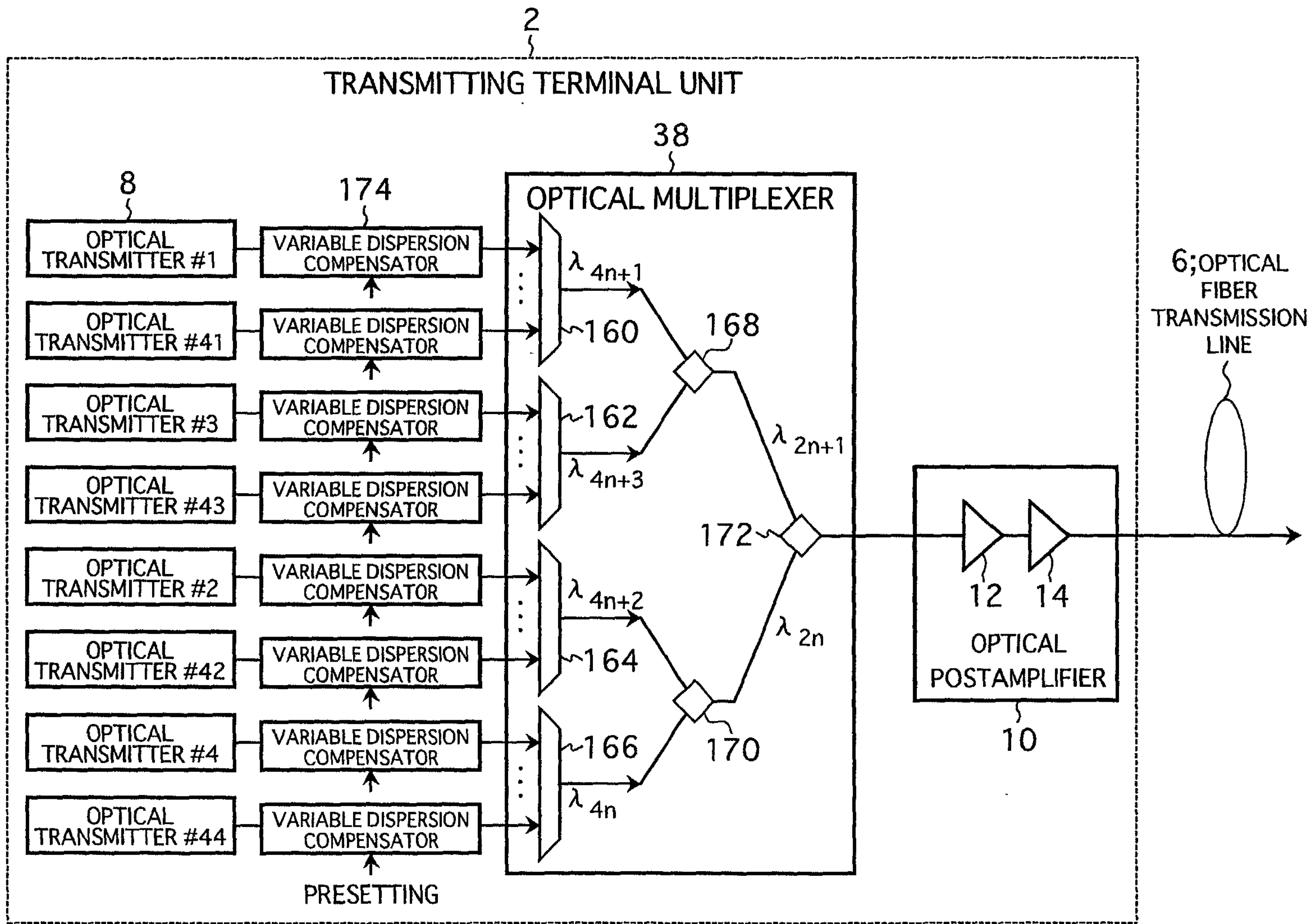

2
TRANSMITTING TERMINAL UNIT
38
OPTICAL MULTIPLEXER
8
174
OPTICAL TRANSMITTER #1
OPTICAL TRANSMITTER #41
OPTICAL TRANSMITTER #3
OPTICAL TRANSMITTER #43
OPTICAL TRANSMITTER #2
OPTICAL TRANSMITTER #42
OPTICAL TRANSMITTER #4
OPTICAL TRANSMITTER #44
VARIABLE DISPERSION COMPENSATOR
PRESETTING
λ 4n+1
160
162
λ 4n+3
λ 4n+2
164
166
λ 4n
168
170
172
λ 2n+1
λ 2n
12
14
OPTICAL POSTAMPLIFIER
10
6;OPTICAL FIBER TRANSMISSION LINE

FIG. 29

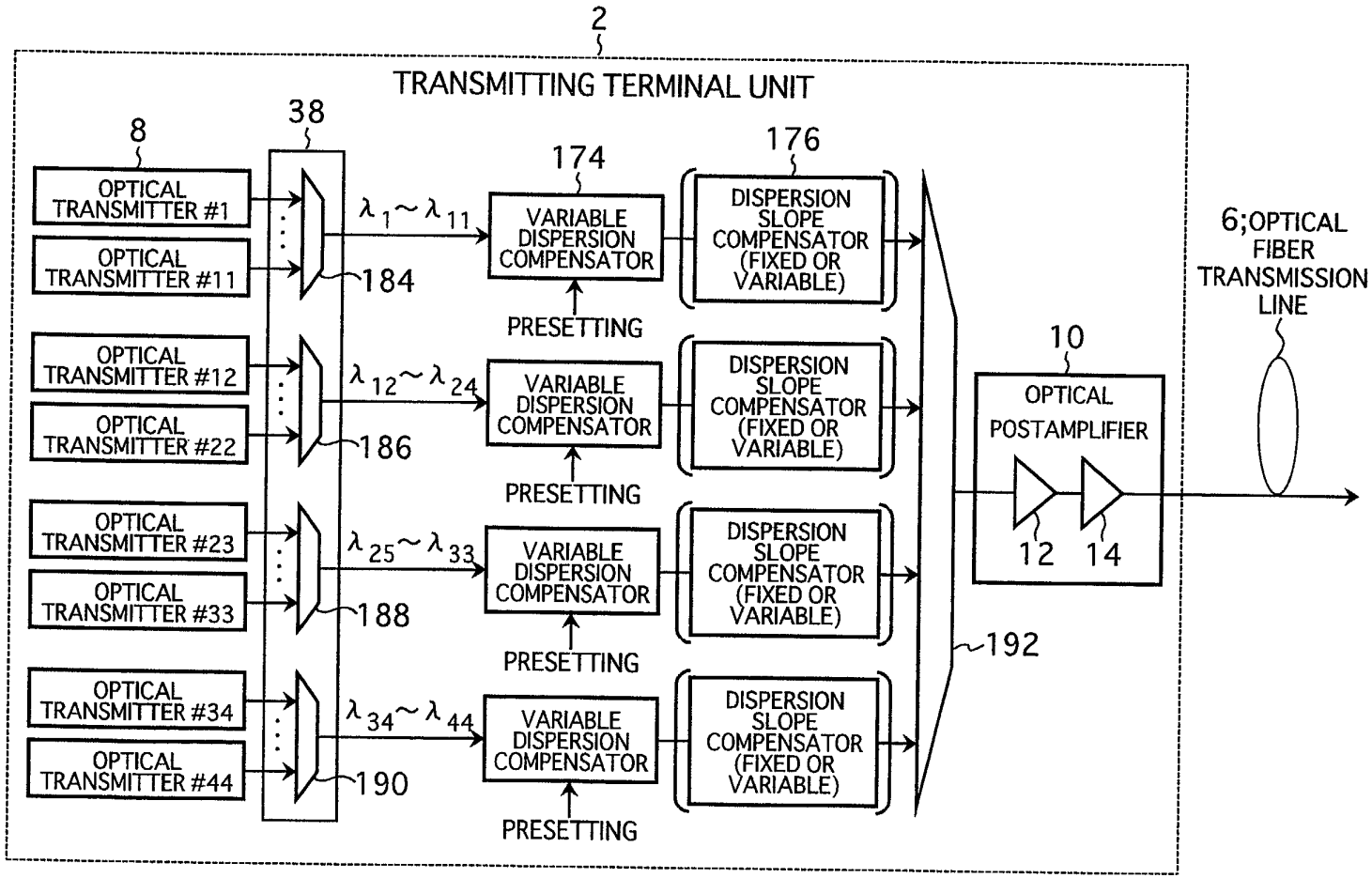
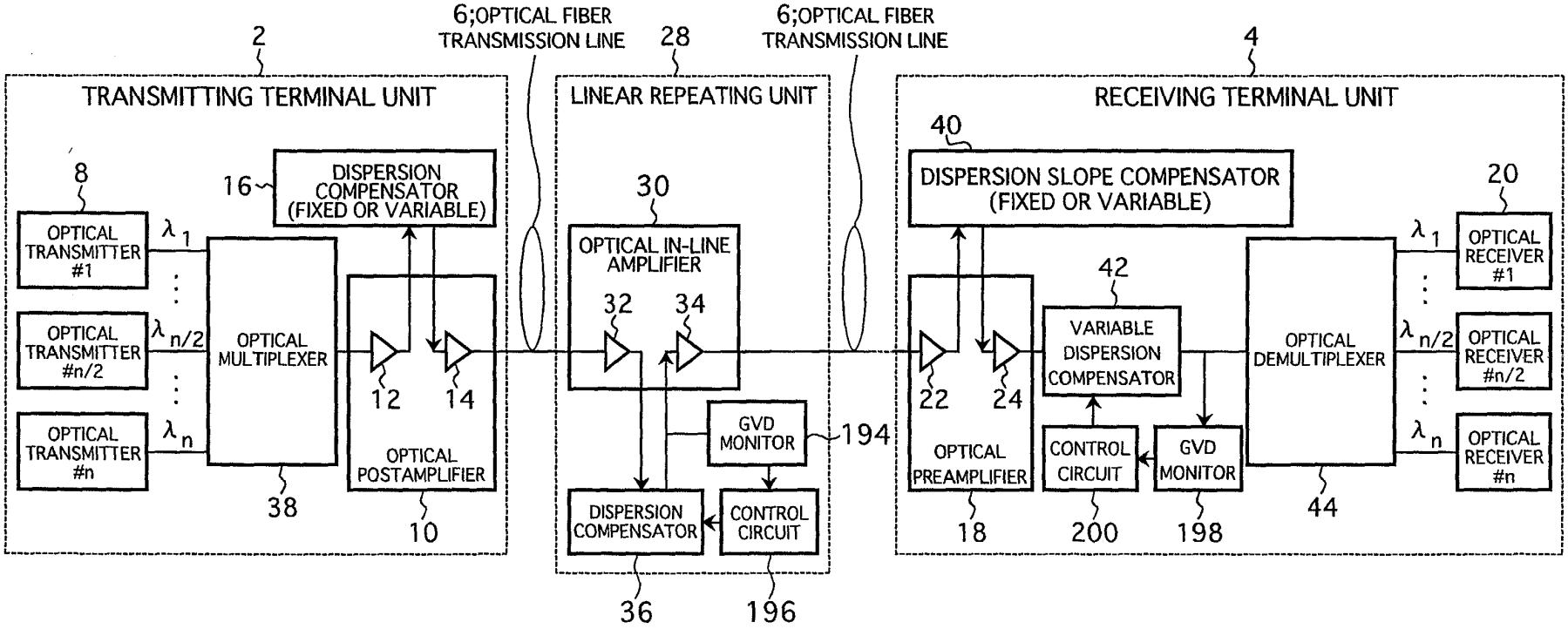

2
TRANSMITTING TERMINAL UNIT
8
38
174
176
OPTICAL TRANSMITTER #1
OPTICAL TRANSMITTER #11
OPTICAL TRANSMITTER #12
OPTICAL TRANSMITTER #22
OPTICAL TRANSMITTER #23
OPTICAL TRANSMITTER #33
OPTICAL TRANSMITTER #34
OPTICAL TRANSMITTER #44
λ1~λ11
λ12~λ24
λ25~λ33
λ34~λ44
184
186
188
190
VARIABLE DISPERSION COMPENSATOR
PRESETTING
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
192
10
OPTICAL POSTAMPLIFIER
12
14
6;OPTICAL FIBER TRANSMISSION LINE

FIG. 30


2
TRANSMITTING TERMINAL UNIT
6;OPTICAL FIBER TRANSMISSION LINE
28
LINEAR REPEATING UNIT
6;OPTICAL FIBER TRANSMISSION LINE
4
RECEIVING TERMINAL UNIT
8
OPTICAL TRANSMITTER #1
OPTICAL TRANSMITTER #n/2
OPTICAL TRANSMITTER #n
λ1
λn/2
λn
16
DISPERSION COMPENSATOR (FIXED OR VARIABLE)
OPTICAL MULTIPLEXER
38
12
14
OPTICAL POSTAMPLIFIER
10
30
OPTICAL IN-LINE AMPLIFIER
32
34
GVD MONITOR
194
DISPERSION COMPENSATOR
CONTROL CIRCUIT
36
196
40
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
22
24
OPTICAL PREAMPLIFIER
18
42
VARIABLE DISPERSION COMPENSATOR
CONTROL CIRCUIT
200
GVD MONITOR
198
OPTICAL DEMULTIPLEXER
44
20
OPTICAL RECEIVER #1
OPTICAL RECEIVER #n/2
OPTICAL RECEIVER #n

F I G. 3 1

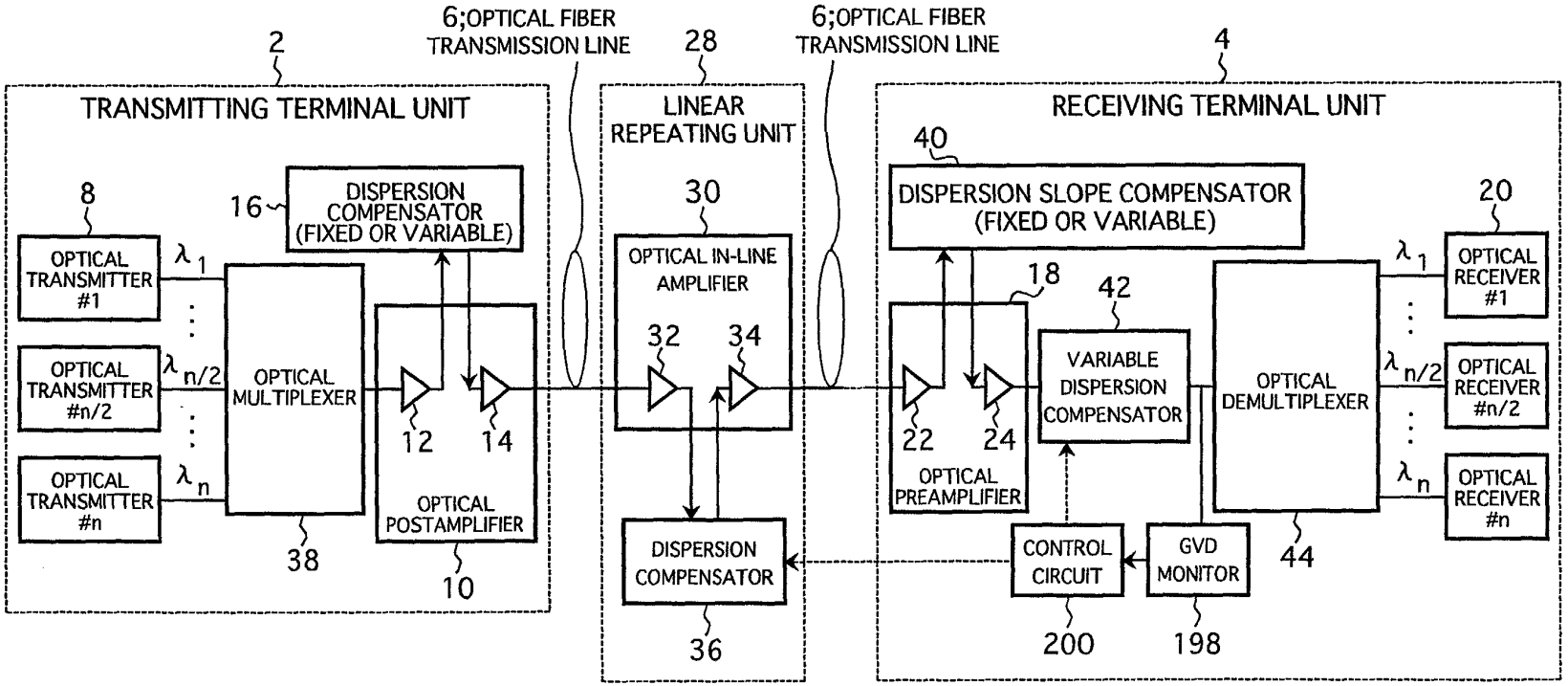
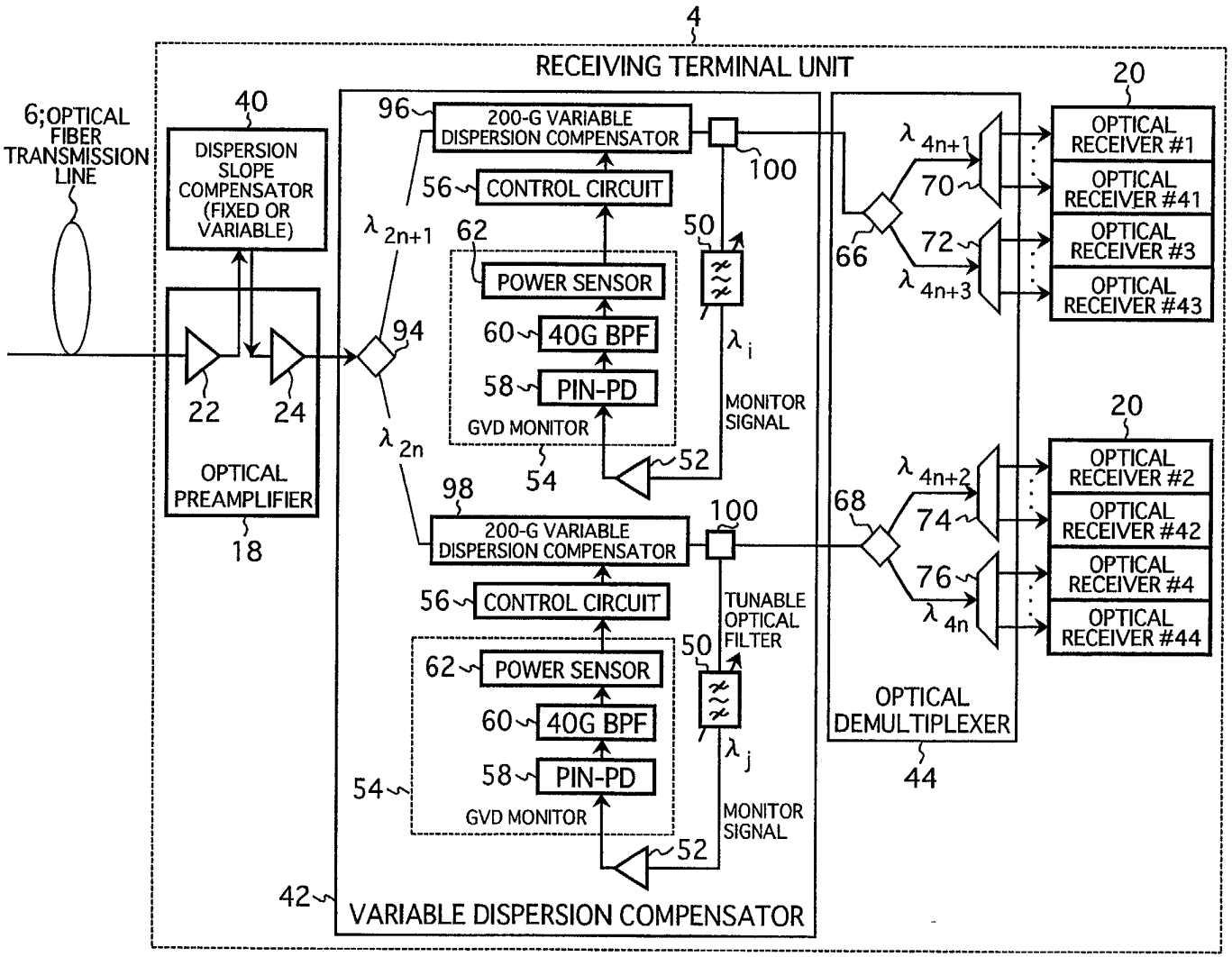
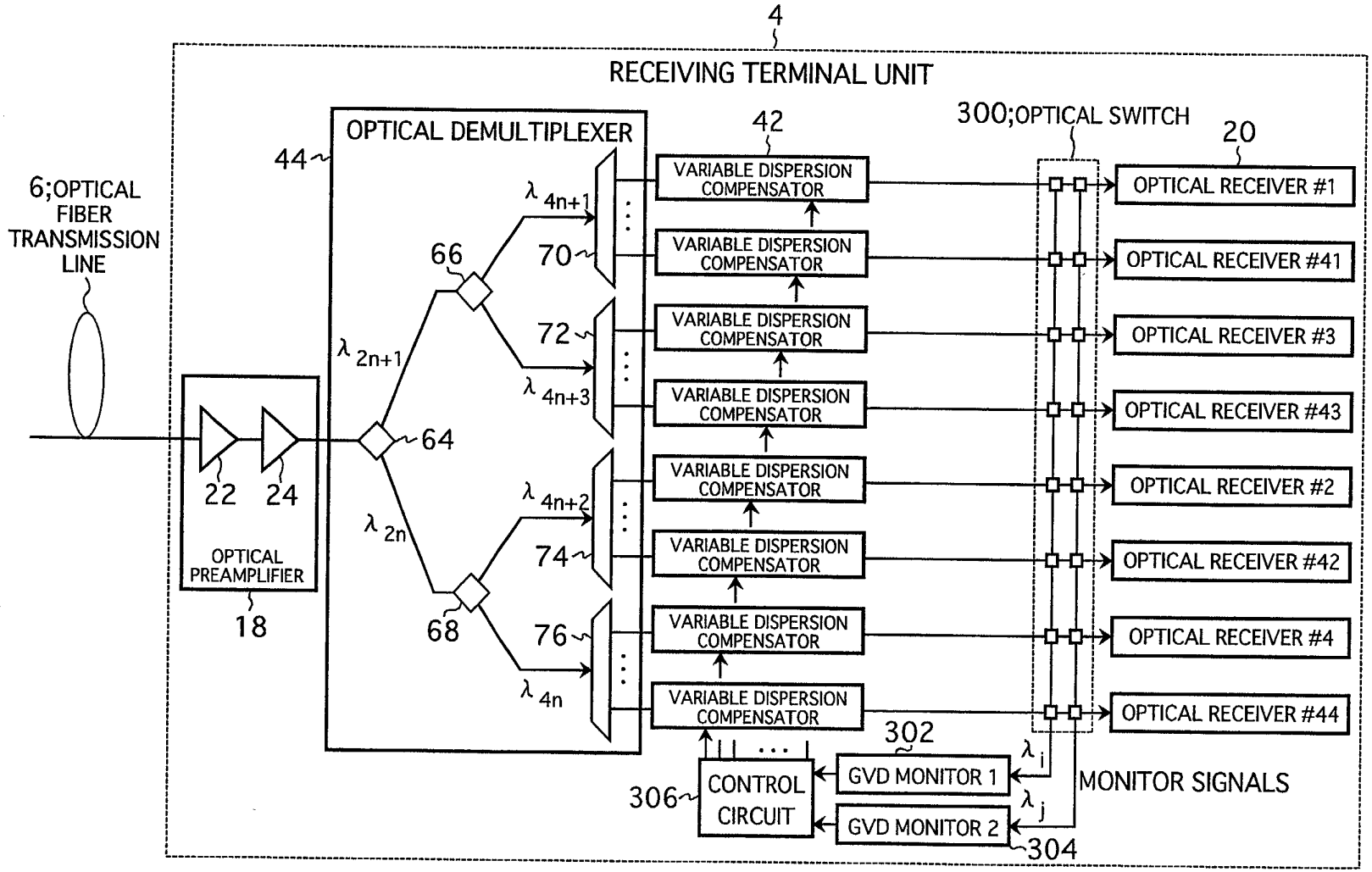


FIG. 32


4
RECEIVING TERMINAL UNIT
6;OPTICAL FIBER TRANSMISSION LINE
40
DISPERSION SLOPE COMPENSATOR (FIXED OR VARIABLE)
22
24
OPTICAL PREAMPLIFIER
18
94
96
200-G VARIABLE DISPERSION COMPENSATOR
56
CONTROL CIRCUIT
62
POWER SENSOR
60
40G BPF
58
PIN-PD
GVD MONITOR
54
52
50
100
MONITOR SIGNAL
λ 2n+1
λ 2n
98
200-G VARIABLE DISPERSION COMPENSATOR
56
CONTROL CIRCUIT
62
POWER SENSOR
60
40G BPF
58
PIN-PD
54
GVD MONITOR
52
50
100
TUNABLE OPTICAL FILTER
MONITOR SIGNAL
λ i
λ j
42
VARIABLE DISPERSION COMPENSATOR
66
68
70
72
74
76
λ 4n+1
λ 4n+3
λ 4n+2
λ 4n
OPTICAL DEMULTIPLEXER
44
20
OPTICAL RECEIVER #1
OPTICAL RECEIVER #41
OPTICAL RECEIVER #3
OPTICAL RECEIVER #43
20
OPTICAL RECEIVER #2
OPTICAL RECEIVER #42
OPTICAL RECEIVER #4
OPTICAL RECEIVER #44

F I G. 3 3


4
RECEIVING TERMINAL UNIT
6;OPTICAL FIBER TRANSMISSION LINE
OPTICAL PREAMPLIFIER
18
22
24
OPTICAL DEMULTIPLEXER
44
64
66
68
70
72
74
76
λ 2n+1
λ 2n
λ 4n+1
λ 4n+3
λ 4n+2
λ 4n
42
VARIABLE DISPERSION COMPENSATOR
300;OPTICAL SWITCH
20
OPTICAL RECEIVER #1
OPTICAL RECEIVER #41
OPTICAL RECEIVER #3
OPTICAL RECEIVER #43
OPTICAL RECEIVER #2
OPTICAL RECEIVER #42
OPTICAL RECEIVER #4
OPTICAL RECEIVER #44
302
GVD MONITOR 1
GVD MONITOR 2
λ i
λ j
MONITOR SIGNALS
304
306
CONTROL CIRCUIT